

AN
HISTORY
OF THE
EARTH,
AND
ANIMATED NATURE:

By OLIVER GOLDSMITH.

IN EIGHT VOLUMES.

VOL. VIII.

L O N D O N:

Printed for J. NOURSE, in the STRAND,
BOOKSELLER to HIS MAJESTY.

MDCCLXXIV.

HISTORY

OF THE
CONTINENTAL
CONGRESS

ATMOSPHERIC NATURE

BY OLIVER GOLDSMITH

IN THREE VOLUMES

VOL. VII

NEW YORK
PRINTED BY
J. B. LIPPINCOTT & CO.
15 N. 2ND ST.



CONTENTS,

PART III.

OF INSECTS.

	Page
CHAP. I. OF CATERPILLARS in general	3
— II. Of the TRANSFORMATION of the CATERPILLAR into its corresponding BUTTERFLY, or MOTH	7
— III. Of BUTTERFLIES and MOTHS	32
— IV. Of the ENEMIES of the CA- TERPILLAR	43
— V. Of the SILK-WORM	49

PART IV.

OF INSECTS.

CHAP. I. Of the FOURTH ORDER of IN- SECTS	63
— II. Of the BEE	65
— III. Of the WASP and HORNET	96
— IV. Of the ICHNEUMON-FLY	III

VOL. VIII.

A 2

CONTENTS.

	Page
CHAP. V. Of the ANT	115
VI. Of the BEETLE, and its Varieties	128
VII. Of the GNAT and the TIPULA	151

PART V. OF INSECTS.

CHAP. I. Of ZOOPHYTES in general	161
II. Of WORMS	166
III. Of the STAR-FISH	174
IV. Of the POLYPUS	179
V. Of LITHOPHYTES and SPONGES	192
INDEX of the Various Matter contained in this Work	201

age
115
128
151

161
166
174
179
192
201

PART III.
AN
HISTORY
OF
INSECTS.

VOL. VIII.

B

PART II

HISTORICAL

OF

INSECTS.

OF THE



AN
HISTORY
OF
INSECTS.

CHAP. I.
Of CATERpillars in General.

IF we take a cursory view of insects in general, caterpillars alone, and the butterflies and moths they give birth to, will make a third part of the number. Wherever we move, wherever we turn, these insects, in one shape or another, present themselves to our view. Some, in every state, offer the most entertaining spectacle; others are beautiful only in their winged form. Many persons, of which number I am one, have an invincible aversion to caterpillars, and worms of every species: there is something disagreeable in their slow crawling motion, for which the variety of their colouring can never compensate. But others feel no repugnance at observing, and even handling them with the most attentive application,

AN HISTORY OF

There is nothing in the butterfly state so beautiful or splendid as these insects. They serve, not less than the birds themselves, to banish solitude from our walks, and to fill up our idle intervals with the most pleasing speculations. The butterfly makes one of the principal ornaments of oriental poetry; but, in those countries, the insect is larger and more beautiful than with us.

The beauties of the fly may therefore very well excite our curiosity to examine the reptile. But we are still more strongly attached to this tribe, from the usefulness of one of the number. The silkworm is, perhaps, the most serviceable of all other animals; since, from its labours, and the manufacture attending it, near a third part of the world are clothed, adorned, and supported.

Caterpillars may be easily distinguished from worms or maggots, by the number of their feet; and by their producing butterflies or moths. When the sun calls up vegetation, and vivifies the various eggs of insects, the caterpillars are the first that are seen, upon almost every vegetable and tree, eating its leaves, and preparing for a state of greater perfection. They have feet both before and behind; which not only enable them to move forward by a sort of steps made by their fore and hinder parts, but also to climb up vegetables, and to stretch themselves out from



CATERPILLARS IN GENERAL.

5

the boughs and stalks, to reach their food, at a distance. All of this class have from eight feet at the least, to sixteen; and this may serve to distinguish them from the worm tribe, that never have so many. The animal into which they are converted, is always a butterfly or a moth; and these are always distinguished from other flies, by having their wings covered over with a painted dust, which gives them such various beauty. The wings of flies are transparent, as we see in the common flesh fly; while those of beetles are hard, like horn: from such the wing of a butterfly may be easily distinguished; and words would obscure their differences.

From hence it appears, that caterpillars; whether in the reptile state, or advanced to their last state of perfection into butterflies, may easily be distinguished from all other insects; being animals peculiarly formed, and also of a peculiar nature. The transmutations they undergo, are also more numerous than those of any insect hitherto mentioned; and, in consequence, they have been placed in the third order of changes by Swammerdam, who has thrown such lights upon this part of natural history. In the second order of changes, mentioned before, we saw the grasshopper and the earwig, when excluded from the egg, assume a form very like

that which they were after to preserve; and seemed arrived at a state of perfection, in all respects, except in not having wings; which did not bud forth until they were come to maturity. But the insects of this third order, that we are now about to describe, go thro' a much greater variety of transformations: for, when they are excluded from the egg, they assume the form of a small caterpillar, which feeds and grows larger every day, often changing its skin, but still preserving its form. When the animal has come to a certain magnitude in this state, it discontinues eating, makes itself a covering or husk, in which it remains wrapped up, seemingly without life or motion; and after having for some time continued in this state, it once more bursts its confinement, and comes forth a butterfly. Thus we see this animal put on no less than three different appearances, from the time it is first excluded from the egg. It appears a crawling caterpillar; then an insensible aurelia, as it is called, without life or motion; and lastly, a butterfly, variously painted, according to its different kind. Having thus distinguished this class of insects from all others, we will first survey their history in general; and then enter particularly into the manners and nature of a few of them, which most deserve our curiosity and attention.

THE CATERPILLAR.

7

CHAP. II.

Of the Transformation of the CATERPILLAR into its corresponding BUTTERFLY or MOTH.

WHEN winter has disrobed the trees of their leaves, Nature then seems to have lost her insects. There are thousands of different kinds, with and without wings, which, though swarming at other seasons, then entirely disappear. Our fields are re-peopled, when the leaves begin to bud, by the genial influence of spring; and caterpillars, of various sorts, are seen feeding upon the promise of the year, even before the leaves are completely unfolded. Those caterpillars, which we then see, may serve to give us a view of the general means which Nature employs to preserve such a number of insects during that season, when they can no longer find subsistence. It is known, by united experience, that all these animals are hatched from the eggs of butterflies; and those who observe them more closely, will find the fly very careful in depositing its eggs in those places where they are likely to be hatched with the greatest safety and success. During winter, therefore, the greatest number of caterpillars are in an egg state; and in this lifeless

situation, brave all the rigours and the humidity of the climate; and though often exposed to all its changes, still preserve the latent principles of life, which is more fully exerted at the approach of spring. That same power that pushes forth the budding leaf, and the opening flower, impels the insect into animation; and Nature at once seems to furnish the guest and the banquet. When the insect has found force to break its shell, it always finds its favourite aliment provided in abundance before it.

But all caterpillars are not sent off from the egg in the beginning of spring; for many of them have subsisted during the winter in their aurelia state: in which, as we have briefly observed above, the animal is seemingly deprived of life and motion. In this state of insensibility, many of these insects continue during the rigours of winter; some enclosed in a kind of shell, which they have spun for themselves at the end of autumn; some concealed under the bark of trees; others in the chinks of old walls; and many buried under ground. From all these, a variety of butterflies are seen to issue, in the beginning of spring; and adorn the earliest part of the year with their painted flutterings.

Some caterpillars do not make any change whatsoever at the approach of winter; but con-

time to live in their reptile state, through all the severity of the season. These chuse themselves some retreat, where they may remain disturbed for months together; and there they continue quite motionless, and as insensible as if they were actually dead. Their constitution is such, that food, at that time, would be useless; and the cold prevents their making those dissipations which require restoration. In general, caterpillars of this kind are found in great numbers together, enclosed in one common web, that covers them all, and serves to protect them from the injuries of the air.

Lastly, there are some of the caterpillar kind, whose butterflies live all the winter; and who, having fluttered about for some part of the latter end of autumn, seek for some retreat during the winter, in order to answer the ends of propagation, at the approach of spring. These are often found lifeless and motionless in the hollows of trees, or the clefts of timber; but, by being approached to the fire, they recover life and activity, and seem to anticipate the desires of spring.

In general, however, whether the animal has subsisted in an egg state, during the winter; or whether as a butterfly, bred from an aurelia, in the beginning of spring; or a butterfly that

has subsisted during the winter, and lays eggs as soon as the leaves of plants are shot forward, the whole swarm of caterpillars are in motion to share the banquet that Nature has provided. There is scarce a plant that has not its own peculiar insects; and some are known to support several of different kinds. Of these, many are hatched from the egg, at the foot of the tree, and climb up to its leaves for subsistence: the eggs of others, have been glued by the parent butterfly to the leaves; and they are no sooner excluded from the shell, but they find themselves in the midst of plenty.

When the caterpillar first bursts from the egg, it is small and feeble; its appetites are in proportion to its size, and it seems to make no great consumption: but as it increases in magnitude, it improves in its appetites; so that, in its adult caterpillar state, it is the most ravenous of all animals whatsoever. A single caterpillar will eat double its own weight of leaves in a day, and yet seems no way disordered by the meal.—What would mankind do, if their oxen or their horses were so voracious!

These voracious habits, with its slow crawling motion, but still more a stinging like that of nettles, which follows upon handling the greatest number of them, make these insects not the most

agreeable objects of human curiosity. However, there are many philosophers who have spent years in their contemplation; and who have not only attended to their habits and labours, but minutely examined their structure and internal conformation.

The body of the caterpillar, when anatomically considered, is found composed of rings, whose circumference is pretty near circular or oval. They are generally twelve in number, and are all membranous; by which caterpillars may be distinguished from many other insects, that nearly resemble them in form. The head of the caterpillar is connected to the first ring by the neck; that is generally so short and contracted, that it is scarce visible. All the covering of the head in caterpillars seems to consist of a shell; and they have neither upper nor under jaw, for they are both placed rather vertically, and each jaw armed with a large thick tooth, which is singly equal to numbers. With these the animals devour their food in such amazing quantities; and with these, some of the kind defend themselves against their enemies. Though the mouth be kept shut, the teeth are always uncovered; and while the insect is in health, they are seldom without employment. Whatever the caterpillar devours, these

teeth serve to chop it into small pieces, and render the parts of the leaf fit for swallowing. Many kinds, while they are yet young, eat only the succulent part of the leaf, and leave all the fibres untouched; others, however, attack the whole leaf, and eat it clean away. One may be amused, for a little time, in observing the avidity with which they are seen to feed; some are seen eating the whole day; others have their hours of repast; some chuse the night, and others the day. When the caterpillar attacks a leaf, it places its body in such a manner that the edge of the leaf shall fall between its feet, which keeps it steady, while the teeth are employed in cutting it: these fall upon the leaf, somewhat in the manner of a pair of gardener's sheers; and every morsel is swallowed as soon as cut. Some caterpillars feed upon leaves so very narrow, that they are not broader than their mouths; in this case the animal is seen to devour it from the point, as we would eat a radish.

As there are various kinds of caterpillars, the number of their feet are various; some having eight, and some sixteen. Of these feet the six foremost are covered with a sort of shining gristle; and are therefore called the shelly legs. The hindmost feet, whatever be

their number, are soft and flexible, and are called membranaceous. Caterpillars also, with regard to their external figure, are either smooth, or hairy. The skin of the first kind is soft to the touch, or hard, like shagreen; the skin of the latter, is hairy, and as it were thorny; and generally, if handled, stings like nettles. Some of them even cause this stinging pain, if but approached too nearly.

Caterpillars, in general, have six small black spots placed on the circumference of the fore ring, and a little to the side of the head. Three of these are larger than the rest, and are convex and transparent: these Reaumur takes to be the eyes of the caterpillar; however, most of these reptiles have very little occasion for sight, and seem only to be directed by their feeling.

But the parts of the caterpillar's body which most justly demand our attention, are the stigmata, as they are called; or those holes on the sides of its body, through which the animal is supposed to breathe. All along this insect's body, on each side, these holes are easily discoverable. They are eighteen in number, nine on a side, rather nearer the belly than the back; one hole for every ring, of which the animal's body is composed, except the second, the third, and the last. These oval openings may be con-

sidered as so many mouths, through which the insect breathes; but with this difference, that as we have but one pair of lungs, the caterpillar has no less than eighteen. It requires no great anatomical dexterity to discover these lungs in the larger kind of caterpillars: they appear, at first view, to be hollow cartilaginous tubes, and of the colour of mother-of-pearl. These tubes are often seen to unite with each other; some are perceived to open into the intestines; and some go to different parts of the surface of the body. That these vessels serve to convey the air, appears evidently, from the famous experiment of Malpighi; who, by stopping up the mouths of the stigmata with oil, quickly suffocated the animal, which was seen to die convulsed the instant after. In order to ascertain his theory, he rubbed oil upon other parts of the insect's body, leaving the stigmata free; and this seemed to have no effect upon the animal's health, but it continued to move and eat as usual: he rubbed oil on the stigmata of one side, and the animal underwent a partial convulsion, but recovered soon after. However it ought to be observed, that air is not so necessary to these as to the nobler ranks of animals, since caterpillars will live in an exhausted receiver for several days together; and though

they seem dead at the bottom, yet, when taken out, recover, and resume their former vivacity.

If the caterpillar be cut open longitudinally along the back, its intestines will be perceived running directly in a straight line from the mouth to the anus. They resemble a number of small bags opening into each other; and strengthened on both sides by a fleshy cord, by which they are united. These insects are, upon many occasions, seen to cast forth the internal coat of their intestines with their food, in the changes which they so frequently undergo. But the intestines take up but a small part of the animal's body, if compared to the fatty substance in which they are involved. This substance changes its colour when the insect's metamorphosis begins to approach; and from white it is usually seen to become yellow. If to these parts, we add the caterpillar's implements for spinning, (for all caterpillars spin at one time or another) we shall have a rude sketch of this animal's conformation! however we shall reserve the description of those parts, till we come to the history of the silk-worm, where the manner in which these insects spin their webs, will most properly find place.

The life of a caterpillar seems one continued succession of changes; and it is seen to throw off

one skin only to assume another; which also is divested in its turn: and thus for eight or ten times successively. We must not, however, confound this changing of the skin with the great metamorphosis which it is afterwards to undergo. The throwing off one skin, and assuming another, seems, in comparison, but a slight operation among these animals: this is but the work of a day; the other is the great adventure of their lives. Indeed, this faculty of changing the skin, is not peculiar to caterpillars only, but is common to all the insect kind; and even to some animals that claim a higher rank in Nature. We have already seen the lobster and the crab out-growing their first shells, and then bursting from their confinement, in order to assume a covering more roomy and convenient. It is probable that the louse, the flea, and the spider, change their covering from the same necessity; and growing too large for the crust in which they have been for some time enclosed, burst it for another. This period is probably that of their growth; for as soon as their new skin is hardened round them, the animal's growth is necessarily circumscribed, while it remains within it. With respect to caterpillars, many of them change their skins five or six times in a season; and

this covering, when cast off, often seems so complete, that many might mistake the empty skin for the real insect. Among the hairy caterpillars, for instance, the cast skin is covered with hair; the feet, as well gristly as membranous, remain fixed to it; even the parts which nothing but a microscope can discover, are visible in it; in short, all the parts of the head; not only the skull but the teeth.

In proportion as the time approaches in which the caterpillar is to cast its old skin, its colours become more feeble, the skin seems to wither and grow dry, and in some measure resembles a leaf, when it is no longer supplied with moisture from the stock. At that time, the insect begins to find itself under a necessity of changing; and it is not effected without violent labour, and perhaps pain. A day or two before the critical hour approaches, the insect ceases to eat, loses its usual activity, and seems to rest immoveable. It seeks some place to remain in security; and no longer timorous, seems regardless even of the touch. It is now and then seen to bend itself and elevate its back; again it stretches to its utmost extent: it sometimes lifts up the head, and then lets it fall again; it sometimes waves it three or four times from side to side, and then remains in quiet. At length, some of

the rings of its body, particularly the first and second, are seen to swell considerably, the old skin distends and bursts, till, by repeated swellings and contractions in every ring, the animal disengages itself, and creeps from its inconvenient covering.

How laborious soever this operation may be, it is performed in the space of a minute; and the animal, having thrown off its old skin, seems to enjoy new vigour, as well as acquired colouring and beauty. Sometimes it happens that it takes a new appearance and colours very different from the old. Those that are hairy, still preserve their covering; although their ancient skin seems not to have lost a single hair: every hair appears to have been drawn, like a sword from the scabbard. However, the fact is, that a new crop of hair grows between the old skin and the new, and probably helps to throw off the external covering.

The caterpillar having in this manner continued for several days feeding, and at intervals casting its skin, begins at last to prepare for its change into an aurelia. It is most probable that, from the beginning, all the parts of the butterfly lay hid in this insect, in its reptile state; but it required time to bring them to perfection; and a large quantity of food, to

enable the animal to undergo all the changes requisite for throwing off these skins, which seemed to clog the butterfly form. However, when the caterpillar has fed sufficiently, and the parts of the future butterfly have formed themselves beneath its skin, it is then time for it to make its first, great, and principal change into an aurelia, or a crysalis, as some have chosen to call it; during which, as was observed, it seems to remain for several days, or even months, without life or motion.

Preparatory to this important change, the caterpillar most usually quits the plant, or the tree on which it fed; or at least attaches itself to the stalk or the stem, more gladly than the leaves. It forsakes its food, and prepares, by fasting, to undergo its transmutation. In this period, all the food it has taken is thoroughly digested; and it often voids even the internal membrane which lined its intestines. Some of this tribe, at this period also, are seen entirely to change colour; and the vivacity of the tints, in all, seems faded. Those of them which are capable of spinning themselves a web, set about this operation; those which have already spun, await the change in the best manner they are able. The web or cone, with which some cover themselves, hides the aurelia contained

within from the view ; but in others, where it is more transparent, the caterpillar, when it has done spinning, strikes into it the claws of the two feet under the tail, and afterwards forces in the tail itself, by contracting those claws, and violently striking the feet one against the other. If, however, they be taken from their web at this time, they appear in a state of great languor ; and, incapable of walking, remain on that spot where they are placed. In this condition they remain one or two days, preparing to change into an aurelia ; somewhat in the manner they made preparations for changing their skin. They then appear with their bodies bent into a bow, which they now and then are seen to straighten : they make no use of their legs ; but if they attempt to change place, do it by the contortions of their body. In proportion as their change into an aurelia approaches, their body becomes more and more bent ; while their extensions and convulsive contractions become more frequent. The hinder end of the body is the part which the animal first disengages from its caterpillar skin ; that part of the skin remains empty, while the body is drawn up contractedly towards the head. In the same manner they disengage themselves from the two succeeding rings ; so that the animal is then lodged entirely in the

THE CATERPILLAR.

21

fore part of its caterpillar covering : that half which is abandoned, remains flaccid and empty; while the fore part, on the contrary, is swollen and distended. The animal, having thus quitted the hinder part of its skin, to drive itself up into the fore part, still continues to heave and work as before; so that the skull is soon seen to burst into three pieces, and a longitudinal opening is made in the three first rings of the body, through which the insect thrusts forth its naked body with strong efforts. Thus at last it entirely gets free from its caterpillar skin, and for ever forsakes its most odious reptile form.

The caterpillar, thus stripped of its skin for the last time, is now become an aurelia; in which the parts of the future butterfly are all visible; but in so soft a state, that the smallest touch can discompose them. The animal is now become helpless and motionless: but only waits for the assistance of the air to dry up the moisture on its surface, and supply it with a crust capable of resisting external injuries. Immediately after being stripped of its caterpillar skin, it is of a green colour, especially in those parts which are distended by an extraordinary afflux of animal moisture; but in ten or twelve hours after being thus exposed, its parts harden,

the air forms its external covering into a firm crust, and in about four and twenty hours, the aurelia may be handled without endangering the little animal that is thus left in so defenceless a situation. Such is the history of the little pod or cone that is found so common by every pathway, sticking to nettles, and sometimes shining like polished gold. From the beautiful and resplendent colour, with which it is thus sometimes adorned, some authors have called it a *Crysalis*, implying a creature made of gold.

Such are the efforts by which these little animals prepare for a state of perfection; but their care is still greater to provide themselves a secure retreat, during this season of their imbecility. It would seem like erecting themselves a monument, where they were to rest secure, until Nature had called them into a new and more improved existence. For this purpose, some spin themselves a cone or web, in which they lie secure till they have arrived at maturity: others, that cannot spin so copious a covering, suspend themselves by the tail, in some retreat where they are not likely to meet disturbances. Some mix sand with their gummy and moist webs, and thus make themselves a secure incrustation; while others, before their change, bury themselves in the ground, and

thus avoid the numerous dangers that might attend them. One would imagine that they were conscious of the precise time of their continuance in their aurelia state; since their little sepulchres, with respect to the solidity of the building, are proportioned to such duration. Those that are to lie in that state of existence but a few days, make choice of some tender leaf, which they render still more pliant by diffusing a kind of glue upon it: the leaf thus gradually curls up, and withering as it enfolds, the insect wraps itself within, as in a mantle, till the genial warmth of the sun enables it to struggle for new life, and burst from its confinement. Others, whose time of transformation is also near at hand, fasten their tails to a tree, or to the first worm-hole they meet, in a beam, and wait in that defenceless situation. Such caterpillars, on the other hand, as are seen to lie several months in their aurelia state, act with much greater circumspection. Most of them mix their web with sand, and thus make themselves a strong covering: others build in wood, which serves them in the nature of a coffin. Such as have made the leaves of willows their favourite food, break the tender twigs of them first into small pieces, then pound them as it were to powder; and, by means of

their glutinous silk, make a kind of paste, in which they wrap themselves up. Many are the forms which these animals assume in this helpless state; and it often happens, that the most deformed butterflies issue from the most beautiful aurelias.

In general, however, the aurelia takes the rude outline of the parts of the animal which is contained within it; but as to the various colours which it is seen to assume, they are rather the effect of accident; for the same species of insect does not at all times assume the same hue, when it becomes an aurelia. In some, the beautiful gold colour is at one time found; in others, it is wanting. This brilliant hue, which does not fall short of the best gilding, is formed in the same manner in which we see leather obtain a gold colour, though none of that metal ever enters into the tincture. It is only formed by a beautiful brown-varnish, laid upon a white ground; and the white thus gleaming through the transparency of the brown, gives a charming golden yellow. These two colours are found, one over the other, in the aurelia of the little animal we are describing; and the whole appears gilded, without any real gilding.

The aurelia thus formed, and left to time to expand into a butterfly, in some measure re-

embles an animal in an egg, that is to wait for external warmth to hatch it into life and vigour. As the quantity of moisture that is enclosed within the covering of the aurelia, continues to keep its body in the most tender state, so it is requisite that this humidity should be dried away, before the little butterfly can burst its prison. Many have been the experiments to prove that Nature may in this respect be assisted by art; and that the life of the insect may be retarded or quickened, without doing it the smallest injury. For this purpose, it is only requisite to continue the insect in its aurelia state, by preventing the evaporation of its humidity; which will consequently add some days, or even weeks, to its life; on the other hand, by evaporating its moisture, in a warm situation, the animal assumes its winged state before its usual time, and goes through the offices assigned to its existence. To prove this, Mr. Reaumur enclosed the aurelia in a glass tube; and found he evaporated water, which exhaled from the body of the insect, collected in drops at the bottom of the tube: he covered the aurelia with varnish; and this making the evaporation more difficult and slow, the butterfly was two months longer than its natural term, in coming out of its case: he found, on the other hand,

that by laying the animal in a warm room, he hastened the disclosure of the butterfly ; and by keeping it in an ice-house in the same manner, he delayed it. Warmth acted, in this case, in a double capacity ; invigorating the animal, and evaporating the moisture.

The aurelia, though it bears a different external appearance, nevertheless contains within it all the parts of the butterfly in perfect formation ; and lying each in a very orderly manner, though in the smallest compass. These, however, are so fast and tender, that it is impossible to visit without discomposing them. When either by warmth, or increasing vigour, the parts have acquired the necessary force and solidity, the butterfly then seeks to disembarraß itself of those bands which kept it so long in confinement. Some insects continue under the form of an aurelia not above ten days ; some twenty ; some several months ; and even for a year together.

The butterfly, however, does not continue so long under the form of an aurelia, as one would be apt to imagine. In general, those caterpillars that provide themselves with cones, continue within them but a few days after the cone is completely finished. Some, however, remain buried in this artificial covering for eight

or nine months, without taking the smallest sustenance during the whole time: and though in the caterpillar state no animals were so voracious, when thus transformed, they appear a miracle of abstinence. In all, sooner or later, the butterfly bursts from its prison; not only that natural prison which is formed by the skin of the aurelia, but also from that artificial one of silk, or any other substance in which it has enclosed itself.

The efforts which the butterfly makes to get free from its aurelia state, are by no means so violent as those which the insect had in changing from the caterpillar into the aurelia. The quantity of moisture surrounding the butterfly is by no means so great as that attending its former change; and the shell of the aurelia is so dry, that it may be cracked between the fingers.

If the animal be shut up within a cone, the butterfly always gets rid of the natural internal skin of the aurelia, before it eats its way through the external covering which its own industry has formed round it. In order to observe the manner in which it thus gets rid of the aurelia covering, we must cut open the cone, and then we shall have an opportunity of discovering the insect's efforts to emancipate itself from its natural shell. When this operation begins, there

seems to be a violent agitation in the humours contained within the little animal's body. Its fluids seem driven, by an hasty fermentation, through all the vessels; while it labours violently with its legs, and makes several other violent struggles to get free. As all these motions concur with the growth of the insect's wings and body, it is impossible that the brittle skin which covers it should longer resist: it at length gives way, by bursting into four distinct and regular pieces. The skin of the head and legs first separates; then the skin at the back flies open, and dividing into two regular portions, disengages the back and wings: then there likewise happens another rupture in that portion which covered the rings of the back of the aurelia. After this, the butterfly, as if fatigued with its struggles, remains very quiet for some time, with its wings pointed downwards, and its legs fixed in the skin which it had just thrown off. At first sight the animal, just set free, and permitted the future use of its wings, seems to want them entirely: they take up such little room, that one would wonder where they were hidden. But soon after, they expand so rapidly, that the eye can scarce attend their unfolding. From reaching scarce half the length of the body, they acquire, in a most wonderful manner, their full

extent and bigness, so as to be each five times larger than they were before. Nor is it the wings alone that are thus increased: all their spots and paintings, before so minute as to be scarce discernible, are proportionably extended; so that, what a few minutes before seemed only a number of confused, unmeaning points, now become distinct and most beautiful ornaments. Nor are the wings, when they are thus expanded, unfolded in the manner in which earwigs and grasshoppers display theirs, who unfurl them like a lady's fan: on the contrary, those of butterflies actually grow to their natural size in this very short space. The wing, at the instant it is freed from its late confinement, is considerably thicker than afterwards; so that it spreads in all its dimensions, growing thinner as it becomes broader. If one of the wings be plucked from the animal just set free, it may be spread by the fingers, and it will soon become as broad as the other, which has been left behind. As the wings extend themselves so suddenly, they have not yet had time to dry; and accordingly appear like pieces of wet paper, soft, and full of wrinkles. In about half an hour, they are perfectly dry, their wrinkles entirely disappear, and the little animal assumes all its splendour. The transmutation being thus per-

fectly finished, the butterfly discharges three or four drops of a blood-coloured liquid, which are the last remains of its superfluous moisture. Those aurelias which are enclosed within a cone, find their exit more difficult, as they have still another prison to break through: this, however, they perform in a short time; for the butterfly, freed from its aurelia skin, butts with its head violently against the walls of its artificial prison; and probably with its eyes, that are rough and like a file, it rubs the internal surface away; till it is at last seen bursting its way into open light; and, in less than a quarter of an hour, the animal acquires its full perfection.

Thus, to use the words of Swammerdam, we see a little insignificant creature distinguished, in its last birth, with qualifications and ornaments, which man, during his stay upon earth, can never even hope to acquire. The butterfly, to enjoy life, needs no other food but the dews of Heaven; and the honeyed juices which are distilled from every flower. The pageantry of princes cannot equal the ornaments with which it is invested; nor the rich colouring that embellishes its wings. The skies are the butterfly's proper habitation, and the air its element: whilst man comes into the

THE CATERPILLAR. 31

world naked, and often roves about without habitation or shelter; exposed, on one hand, to the heat of the sun; and, on the other, to the damps and exhalations of the earth; both alike enemies of his happiness and existence.—

A strong proof that, while this little animal is raised to its greatest height, we are as yet, in this world, only candidates for perfection!

CHAP. III.

OF BUTTERFLIES and MOTHS.

IT has been already shewn that all Butterflies are bred from caterpillars; and we have exhibited the various circumstances of that surprising change. It has been remarked, that butterflies may be easily distinguished from flies of every other kind, by their wings; for, in others, they are either transparent, like gauze, as we see in the common flesh fly; or they are hard and crufted, as we see the wings of the beetle. But in the butterfly, the wings are soft, opaque, and painted over with a beautiful dust, that comes off with handling.

The number of these beautiful animals is very great; and though Linnæus has reckoned up above seven hundred and sixty different kinds, the catalogue is still very incomplete. Every collector of butterflies can shew undescribed species: and such as are fond of minute discovery, can here produce animals that have been examined only by himself. In general, however, those of the warm climates, are larger and more beautiful than such as are bred at home; and we can easily admit the beauty of

the butterfly, since we are thus freed from the damage of the caterpillar. It has been the amusement of some to collect these animals, from different parts of the world; or to breed them from caterpillars at home. These they arrange in systematic order; or dispose so as to make striking and agreeable pictures: and all must grant, that this specious idleness is far preferable to that unhappy state which is produced by a total want of employment.

The wings of butterflies, as was observed, fully distinguish them from flies of every other kind. They are four in number; and though two of them be cut off, the animal can fly with the two others remaining. They are, in their own substance, transparent; but owe their opacity to the beautiful dust with which they are covered; and which has been likened, by some naturalists, to the feathers of birds; by others, to the scales of fishes; as their imaginations were disposed to catch the resemblance. In fact, if we regard the wing of a butterfly with a good microscope, we shall perceive it studded over with a variety of little grains of different dimensions and forms, generally supported upon a footstalk, regularly laid upon the whole surface. Nothing can exceed the beautiful and regular arrangement of these little substances;

which thus serve to paint the butterfly's wing, like the tiles of an house. Those of one rank are a little covered by those that follow: they are of many figures: on one part of the wing may be seen a succession of oval studs; on another part, a cluster of studs, each in the form of an heart: in one place they resemble a hand open; and in another they are long or triangular; while all are interspersed with taller studs, that grow between the rest, like mushrooms upon a stalk. The wing itself is composed of several thick nerves, which render the construction very strong, though light; and though it be covered over with thousands of these scales or studs, yet its weight is very little increased by the number. The animal is with ease enabled to support itself a long while in air, although its flight be not very graceful. When it designs to fly to a considerable distance, it ascends and descends alternately; going sometimes to the right, sometimes to the left, without any apparent reason. Upon closer examination, however, it will be found that it flies thus irregularly in pursuit of its mate; and as dogs bait and quarter the ground in pursuit of their game, so these insects traverse the air, in quest of their mates whom they can discover at more than a mile's distance.

If we prosecute our description of the butterfly, the animal may be divided into three parts; the head, the corselet, and the body.

The body is the hinder part of the butterfly, and is composed of rings, which are generally concealed under long hair, with which that part of the animal is clothed. The corselet is more solid than the rest of the body, because the fore wings, and the legs are fixed therein. The legs are six in number, although four only are made use of by the animal; the two fore legs being often so much concealed in the long hair of the body, that it is sometimes difficult to discover them. If we examine these parts internally, we shall find the same set of vessels in the butterfly that we observed in the caterpillar, but with this great difference, that as the blood, or humours, in the caterpillar, circulated from the tail to the head, they are found, in the butterfly, to take a direct contrary course, and to circulate from the head to the tail; so that the caterpillar may be considered as the embryo animal, in which, as we have formerly seen, the circulation is carried on differently from what it is in animals when excluded.

But leaving the other parts of the butterfly, let us turn our attention particularly to the head. The eyes of butterflies have not all the same

form; for in some they are large, in others small; in some they are the larger portion of a sphere, in others they are but a small part of it, and just appearing from the head. In all of them, however, the outward coat has a lustre, in which may be discovered the various colours of the rainbow. When examined a little closely, it will be found to have the appearance of a multiplying glass; having a great number of sides, or facets, in the manner of a brilliant cut diamond. In this particular, the eye of the butterfly, and of most other insects, entirely correspond; and Luenhoek pretends, there are above six thousand facets on the cornea of a flea. These animals, therefore, see not only with great clearness; but view every object multiplied in a surprising manner. Puget adapted the cornea of a flea in such a position, as to see objects through it by the means of a microscope; and nothing could exceed the strangeness of its representations: a soldier, who was seen through it, appeared like an army of pigmies; for while it multiplied, it also diminished the object: the arch of a bridge exhibited a spectacle more magnificent than human skill could perform; the flame of a candle seemed a beautiful illumination. It still, however, remains a doubt,

whether the insect sees objects singly, as with one eye; or whether every facet is itself a complete eye, exhibiting its own object distinct from all the rest.

Butterflies, as well as most other flying insects, have two instruments, like horns, on their heads which are commonly called feelers. They differ from the horns of greater animals, in being moveable at their base; and in having a great number of joints, by which means the insect is enabled to turn them in every direction. Those of butterflies are placed at the top of the head, pretty near the external edge of each eye. What the use of these instruments may be, which are thus formed with so much art, and by a Workman who does nothing without reason, is as yet unknown to man. They may serve to guard the eye; they may be of use to clean it; or they may be the organ of some sense which we are ignorant of: but this is only explaining one difficulty by another.

We are not so ignorant of the uses of the trunk, which few insects of the butterfly kind are without. This instrument is placed exactly between the eyes; and when the animal is not employed in seeking its nourishment, it is rolled up, like a curl. A butterfly, when it is feeding, flies round some flower, and settles upon it.

The trunk is then uncurled, and thrust out either wholly or in part; and is employed in searching the flower to its very bottom, let it be ever so deep. This search being repeated seven or eight times, the butterfly then passes to another; and continues to hover over those agreeable to its taste, like a bird over its prey. This trunk consists of two equal hollow tubes, nicely joined to each other, like the pipes of an organ.

Such is the figure and conformation of these beautiful insects, that cheer our walks, and give us the earliest intimations of summer. But it is not by day alone that they are seen fluttering wantonly from flower to flower, as the greatest number of them fly by night, and expand the most beautiful colouring, at those hours when there is no spectator. This tribe of insects has therefore been divided into Diurnal and Nocturnal Flies; or, more properly speaking, into Butterflies and Moths: the one only flying by day, the other most usually on the wing in the night. They may be easily distinguished from each other, by their horns or feelers: those of the butterfly being clubbed, or knobbed at the end; those of the moth, tapering finer and finer to a point. To express it technically—the feelers of butterflies are clavated; those of moths, are filiform.

The butterflies, as well as the moths, employ the short life assigned them, in a variety of enjoyments. Their whole time is spent either in quest of food, which every flower offers; or in pursuit of the female, whose approach they can often perceive at a very great distance. Their sagacity in this particular is not less astonishing than true; but by what sense they are thus capable of distinguishing each other at such distances, is not easy to conceive. It cannot be by the sight, since such small objects as they are must be utterly imperceptible, at half the distance at which they perceive each other: it can scarcely be by the sense of smelling, since the animal has no organs for that purpose. Whatever be their powers of perception, certain it is, that the male, after having fluttered, as if carelessly, about for some time, is seen to take wing, and go forward, sometimes for two miles together, in a direct line to where the female is perched on a flower.

The general rule among insects is, that the female is larger than the male; and this obtains particularly in the tribe I am describing. The body of the male is smaller and slenderer; that of the female, more thick and oval. Previous to the junction of these animals, they are seen sporting in the air, pursuing and flying from

each other, and preparing, by a mock combat, for the more important business of their lives. If they be disturbed while united, the female flies off with the male on her back, who seems entirely passive upon the occasion.

But the females of many moths and butterflies seem to have assumed their airy form for no other reason but to fecundate their eggs, and lay them. They are not seen fluttering about in quest of food, or a mate: all that passes during their short lives, is a junction with the male of about half an hour; after which they deposite their eggs, and die, without taking any nourishment, or seeking any. It may be observed, however, that in all the females of this tribe, they are impregnated by the male by one apperture, and lay their eggs by another.

The eggs of female butterflies are disposed in the body like a bed of chaplets; which, when excluded, are usually oval, and of a whitish colour: some, however, are quite round; and others flattened, like a turnip. The covering or shell of the egg, though solid, is thin and transparent; and in proportion as the caterpillar grows within the egg, the colours change, and are distributed differently. The butterfly seems very well instructed by nature in its choice of the plant, or the leaf, where it shall deposite its

burthen. Each egg contains but one caterpillar; and it is requisite that this little animal, when excluded, should be near its peculiar provision. The butterfly, therefore, is careful to place her brood only upon those plants that afford good nourishment to its posterity. Though the little winged animal has been fed itself upon dew, or the honey of flowers, yet it makes choice for its young of a very different provision, and lays its eggs on the most unsavoury plants; the rag-weed, the cabbage, or the nettle. Thus every butterfly chuses not the plant most grateful to it in its winged state; but such as it has fed upon in its reptile form.

All the eggs of butterflies are attached to the leaves of the favourite plant, by a sort of size or glue; where they continue, unobserved, unless carefully sought after. The eggs are sometimes placed round the tender shoots of plants, in the form of bracelets, consisting of above two hundred in each, and generally surrounding the shoot, like a ring upon a finger. Some butterflies secure their eggs from the injuries of air, by covering them with hair, plucked from their own bodies, as birds sometimes are seen to make their nests; so that their eggs are thus kept warm, and also entirely concealed.

All the tribe of female moths lay their eggs a short time after they leave the aurelia; but there are many butterflies that flutter about the whole summer, and do not think of laying, till the winter begins to warn them of their approaching end: some even continue the whole winter in the hollows of trees, and do not provide for posterity until the beginning of April, when they leave their retreats, deposite their eggs, and die. Their eggs soon begin to feel the genial influence of the season: the little animals burst from them in their caterpillar state, to become aurelias, and butterflies in their turn; and thus to continue the round of Nature.

C H A P. IV.

Of the Enemies of the CATERPILLAR.

NATURE, though it has rendered some animals surprisngly fruitful, yet ever takes care to prevent their too great increase. One set of creatures is generally opposed to another: and those are chiefly the most prolific, that are, from their imbecility, incapable of making any effectual defence. The caterpillar has perhaps, of all other animals, the greatest number of enemies; and seems only to exist, by its surprisng fecundity. Some animals devour them by hundreds; others, more minute, yet more dangerous, mangle them in various ways: so that, how great soever their numbers may be, their destroyers are in equal proportion. Indeed, if we consider the mischiefs these reptiles are capable of occasioning, and the various damages we sustain from their insatiable rapacity, it is happy for the other ranks of Nature, that there are thousands of fishes, birds, and even insects, that live chiefly upon caterpillars, and make them their most favourite repast.

When we described the little birds that live in our gardens, and near our houses, as de-

fructive neighbours, sufficient attention was not paid to the services which they are frequently found to render us. It has been proved, that a single sparrow and its mate, that have young ones, destroy above three thousand caterpillars in a week; not to mention several butterflies, in which numberless caterpillars are destroyed in embryo. (It is in pursuit of these reptiles that we are favoured with the visits of many of our most beautiful songsters; that amuse us during their continuance, and leave us when the caterpillars disappear.

The maxim which has often been urged against man, that he, of all other animals, is the only creature that is an enemy to his own kind, and that the human species only are found to destroy each other, has been adapted, by persons who never considered the history of insects. Some of the caterpillar kind in particular, that seem fitted only to live upon leaves and plants, will, however, eat each other; and the strongest will devour the weak, in preference to their vegetable food. That which lives upon the oak, is found to seize any of its companions, which it conveniently can, by the first rings, and inflict a deadly wound: it then feasts in tranquility on its prey, and leaves nothing of the animal but the husk.

ENEMIES OF THE CATERPILLAR. 45

But it is not from each other they have most to fear, as in general they are inoffensive; and many of this tribe are found to live in a kind of society. Many kind of flies lay their eggs either upon, or within their bodies; and as these turn into worms, the caterpillar is seen to nourish a set of intestine enemies within its body, that must shortly be its destruction: Nature having taught flies, as well as all other animals, the surest methods of perpetuating their kind.—

“Towards the end of August,” says Reaumur, “I perceived a little fly, of a beautiful gold colour, busily employed in the body of a large caterpillar, of that kind which feeds upon cabbage. I gently separated that part of the leaf on which these insects were placed, from the rest of the plant, and placed it where I might observe them more at my ease. The fly, wholly taken up by the business in which it was employed, walked along the caterpillar’s body, now and then remaining fixed to a particular spot. Upon this occasion, I perceived it every now and then dart a sting, which it carried at the end of its tail, into the caterpillar’s body, and then drew it out again, to repeat the same operation in another place. It was not difficult for me to conjecture the business which engaged this animal so ear-

fructive neighbours, sufficient attention was not paid to the services which they are frequently found to render us. It has been proved, that a single sparrow and its mate, that have young ones, destroy above three thousand caterpillars in a week; not to mention several butterflies, in which numberless caterpillars are destroyed in embryo. (It is in pursuit of these reptiles that we are favoured with the visits of many of our most beautiful songsters; that amuse us during their continuance, and leave us when the caterpillars disappear.

The maxim which has often been urged against man, that he, of all other animals, is the only creature that is an enemy to his own kind, and that the human species only are found to destroy each other, has been adopted, by persons who never considered the history of insects. Some of the caterpillar kind in particular, that seem fitted only to live upon leaves and plants, will, however, eat each other; and the strongest will devour the weak, in preference to their vegetable food. That which lives upon the oak, is found to seize any of its companions, which it conveniently can, by the first rings, and inflict a deadly wound: it then feasts in tranquillity on its prey, and leaves nothing of the animal but the husk.

But it is not from each other they have most to fear, as in general they are inoffensive; and many of this tribe are found to live in a kind of society. Many kind of flies lay their eggs either upon, or within their bodies; and as these turn into worms, the caterpillar is seen to nourish a set of intestine enemies within its body, that must shortly be its destruction: Nature having taught flies, as well as all other animals, the surest methods of perpetuating their kind.—

“Towards the end of August,” says Reaumur, “I perceived a little fly, of a beautiful gold colour, busily employed in the body of a large caterpillar, of that kind which feeds upon cabbage. I gently separated that part of the leaf on which these insects were placed, from the rest of the plant, and placed it where I might observe them more at my ease. The fly, wholly taken up by the business in which it was employed, walked along the caterpillar’s body, now and then remaining fixed to a particular spot. Upon this occasion, I perceived it every now and then dart a sting, which it carried at the end of its tail, into the caterpillar’s body, and then drew it out again, to repeat the same operation in another place. It was not difficult for me to conjecture the business which engaged this animal so ear-

“ nestly ; its whole aim was to deposite its eggs
“ in the caterpillar’s body ; which was to serve
“ as a proper retreat for bringing them to per-
“ fection. The reptile thus rudely treated,
“ seemed to bear all very patiently, only mov-
“ ing a little when stung too deeply ; which,
“ however, the fly seemed entirely to disregard.
“ I took particular care to feed this caterpillar ;
“ which seemed to me to continue as voracious
“ and vigorous as any of the rest of this kind.
“ In about ten or twelve days, it changed into
“ an aurelia, which seemed gradually to decline,
“ and died : upon examining its internal parts,
“ the animal was entirely devoured by worms ;
“ which, however, did not come to perfection,
“ as it is probable they had not enough to
“ sustain them within.”

What the French philosopher perceived upon this occasion, is every day to be seen in several of the larger kinds of caterpillars, whose bodies serve as a nest to various flies, that very carefully deposite their eggs within them. The large cabbage caterpillar is so subject to its injuries that, at certain seasons, it is much easier to find them with than without them. The ichneumon fly, as it is called, particularly infests these reptiles, and prevents their fecundity. This fly is of all others, the most formidable to insects

of various kinds. The spider, that destroys the ant, the moth, and the butterfly, yet often falls a prey to the ichneumon; who pursues the robber to his retreat, and, despising his nets, tears him in pieces, in the very labyrinth he has made. This insect, as redoubtable as the little quadrupede that destroys the crocodile, has received the same name; and from its destruction of the caterpillar tribe, is probably more serviceable to mankind. This insect, I say, makes the body of the caterpillar the place for depositing its eggs; to the number of ten, fifteen, or twenty. As they are laid in those parts which are not mortal, the reptile still continues to live, and to feed, shewing no signs of being incommoded by its new guests. The caterpillar changes its skin; and sometimes undergoes the great change into an aurelia: but still the fatal intruders work within, and secretly devour its internal substance: soon after they are seen bursting through its skin, and moving away, in order to spin themselves a covering, previous to their own little transformation. It is indeed astonishing sometimes to see the number of worms, and those pretty large, that thus issue from the body of a single caterpillar, and eat their way through its skin: but it is more extraordinary still, that they should remain within the body, devouring

its entrails, without destroying its life. The truth is, they seem instructed by Nature not to devour its vital parts; for they are found to feed only upon that fatty substance which composes the largest part of the caterpillar's body. When this surprising appearance was first observed, it was supposed that the animal thus gave birth to a number of flies, different from itself; and that the same caterpillar sometimes bred an ichneumon, and sometimes a butterfly: but it was not till after more careful inspection, it was discovered, that the ichneumon tribe were not the caterpillar's offspring, but its murderers.

C H A P. V.

Of the SILKWORM.

HAVING mentioned, in the last chapter, the damages inflicted by the caterpillar tribe, we now come to an animal of this kind, that alone compensates for all the mischief occasioned by the rest. This little creature, which only works for itself, has been made of the utmost service to man; and furnishes him with a covering more beautiful than any other animal can supply. We may declaim indeed against the luxuries of the times, when silk is so generally worn; but were such garments to fail, what other arts could supply their deficiency?

Though silk was anciently brought in small quantities to Rome, yet it was so scarce as to be sold for its weight in gold; and was considered as such a luxurious refinement in dress, that it was infamous for a man to appear in habits of which silk formed but half the composition. It was most probably brought among them from the remotest parts of the East; since it was, at the time of which I am speaking, scarcely known even in Persia.

Nothing can be more remote from the truth,

VOL. VIII.

E

than the manner in which their historians describe the animal by which silk is produced. Pausanius informs us, that silk came from the country of the Seres, a people of Asiatic Scythia; in which place an insect, as large as the beetle, but in every other respect resembling a spider, was bred up for that purpose. They take great care, as he assures us, to feed and defend it from the weather; as well during the summer's heat, as the rigours of winter. This insect, he observes, makes its web with its feet, of which it has eight in number. It is fed, for the space of four years, upon a kind of paste, prepared for it; and at the beginning of the fifth, it is supplied with the leaves of the green willow, of which it is particularly fond. It then feeds till it bursts with fat; after which they take out its bowels, which are spun into the beautiful manufacture so scarce and costly.

The real history of this animal was unknown among the Romans till the times of Justinian; and it is supposed, that silkworms were not brought into Europe till the beginning of the twelfth century; when Roger of Sicily brought workmen in this manufacture from Asia Minor, after his return from his expedition to the Holy Land, and settled them in Sicily and Calabria. From these the other kingdoms of Europe

learned this manufacture ; and it is now one of the most lucrative carried on among the southern provinces of Europe.

The silkworm is now very well known to be a large caterpillar, of a whitish colour, with twelve feet, and producing a butterfly of the moth kind. The cone on which it spins, is formed for covering it while it continues in the aurelia state; and several of these, properly wound off, and united together, form those strong and beautiful threads, which are woven into silk. The feeding these worms, the gathering, the winding, the twisting, and the weaving their silk, is one of the principal manufactures of Europe ; and, as our luxuries increase, seems every day to become more and more necessary to human happiness.

There are two methods of breeding silkworms ; for they may be left to grow, and remain at liberty upon the trees where they are hatched ; or they may be kept in a place built for that purpose, and fed every day with fresh leaves. The first method is used in China, Tonquin, and other hot countries ; the other is used in those places where the animal has been artificially propagated, and still continues a stranger. In the warm climates, the silkworm proceeds from an egg, which has been glued

by the parent moth upon proper parts of the mulberry-tree, and which remains in that situation during the winter. The manner in which they are situated and fixed to the tree, keeps them unaffected by the influence of the weather; so that those frosts which are severe enough to kill the tree, have no power to injure the silkworm.

The insect never proceeds from the egg till Nature has provided it a sufficient supply; and till the budding leaves are furnished, in sufficient abundance, for its support. When the leaves are put forth, the worms seem to feel the genial summons, and bursting from their little eggs, crawl upon the leaves, where they feed with a most voracious appetite. Thus they become larger by degrees; and after some months feeding, they lay, upon every leaf, small bundles, or cones of silk, which appear like so many golden apples, painted on a fine green ground. Such is the method of breeding them in the East; and without doubt it is best for the worms, and least troublesome for the feeder of them. But it is otherwise in our colder European climates; the frequent changes of the weather, and the heavy dews of our evenings, render the keeping them all night exposed, subject to so many inconveniences, as to admit

of no remedy. It is true, that by the assistance of nets, they may be preserved from the insults of birds; but the severe cold weather, which often succeeds the first heats of summer, as well as the rain and high winds, will destroy them all: and, therefore, to breed them in Europe, they must be sheltered and protected from every external injury.

For this purpose, a room is chosen, with a south aspect; and the windows are so well glazed, as not to admit the least air: the walls are well built, and the planks of the floor exceeding close, so as to admit neither birds nor mice, nor even so much as an insect. In the middle there should be four pillars erected, or four wooden posts, so placed as to form a pretty large square. Between these are different stories made with osier hurdles; and under each hurdle there should be a floor, with an upright border all round. These hurdles and floors must hang upon pulleys, so as to be placed, or taken down at pleasure.

When the worms are hatched, some tender mulberry leaves are provided, and placed in the cloth or paper box in which the eggs were laid, and which are large enough to hold a great number. When they have acquired some strength, they must be distributed on beds of

mulberry leaves, in the different stories of the square in the middle of the room, round which a person may freely pass on every side. They will fix themselves to the leaves, and afterwards to the sticks of the hurdles, when the leaves are devoured. They have then a thread, by which they can suspend themselves on occasion, to prevent any shock by a fall; but this is by no means to be considered, as the silk which they spin afterwards in such abundance. Care must be taken that fresh leaves be brought every morning, which must be strewed very gently and equally over them; upon which the silkworms will forsake the remainder of the old leaves, which must be carefully taken away, and every thing kept very clean; for nothing hurts these insects so much as moisture and uncleanness. For this reason their leaves must be gathered when the weather is dry, and kept in a dry place, if it be necessary to lay in a store. As these animals have but a short time to live, they make use of every moment, and almost continually are spinning, except at those intervals when they change their skins. If mulberry leaves be difficult to be obtained, the leaves of lettuce or holyoak will sustain them: but they do not thrive so well upon their new diet; and their silk will neither be so copious, nor of so good a quality.

Though the judicious choice, and careful management of their diet, is absolutely necessary, yet there is another precaution of equal importance, which is to give them air, and open their chamber windows, at such times as the sun shines warmest. The place also must be kept as clean as possible; not only the several floors that are laid to receive their ordure, but the whole apartments in general. These things well observed, contribute greatly to their health and increase.

The worm, at the time it bursts the shell, is extremely small, and of a black colour; but the head is of a more shining black than the rest of the body: some days after, they begin to turn whitish, or of an ash-coloured grey. After the skin begins to grow too rigid, or the animal is stunted within it, the insect throws it off, and appears clothed a-new: it then becomes larger and much whiter, tho' it has a greenish cast: after some days, which are more or less, according to the different heat of the climate, or to the quality of the food, it leaves off eating, and seems to sleep for two days together: then it begins to stir, and put itself into violent motions, till the skin falls off the second time, and is thrown aside by the animal's feet. All these changes are made in three weeks

or a month's time; after which it begins to feed once more, still in its caterpillar form, but a good deal differing from itself before its change. In a few days' time it seems to sleep again; and, when it awakes, it again changes its clothing, and continues feeding as before. When it has thus taken a sufficiency of food, and its parts are disposed for assuming the aurelia form, the animal forsakes, for the last time, all food and society, and prepares itself a retreat to defend it from external injuries, while it is seemingly deprived of life and motion.

This retreat is no other than its cone, or ball of silk, which Nature has taught it to compose with great art; and within which it buries itself, till it assumes its winged form. This cone or ball is spun from two little longish kinds of bags that lie above the intestines, and are filled with a gummy fluid, of a marigold colour. This is the substance of which the threads are formed; and the little animal is furnished with a surprising apparatus for spinning it to the degree of fineness which its occasions may require. This instrument in some measure resembles a wire-drawer's machine, in which gold or silver threads are drawn to any degree of minuteness; and through this the animal draws its thread with great assiduity. As every thread proceeds

From two gum bags, it is probable that each supplies its own; which, however, are united, as they proceed from the animal's body. If we examine the thread with a microscope, it will be found that it is flattened on one side, and grooved along its length: from hence we may infer, that it is doubled just upon leaving the body; and that the two threads stick to each other by that gummy quality of which they are possessed. Previous to spinning its web, the silkworm seeks out some convenient place to erect its cell, without any obstruction. When it has found a leaf, or a chink fitted to its purpose, it begins to wreath its head in every direction, and fastens its thread on every side to the sides of its retreat. Though all its first essays seem perfectly confused, yet they are not altogether without design: there appears indeed, no order or contrivance in the disposal of its first threads; they are by no means laid artfully over each other, but are thrown out at random, to serve as an external shelter against rain; for Nature having appointed the animal to work upon trees in the open air, its habits remain, though it is brought up in a warm apartment.

Malpighi pretends to have observed six different layers in a single cone of filk: but what

may easily be observed is, that it is composed externally of a kind of rough cotton-like substance, which is called floss; within the thread is more distinct and even; and next the body of the aurelia, the apartment seems lined with a substance of the hardness of paper, but of a much stronger consistence. It must not be supposed, that the thread which goes to compose the cone, is rolled round, as we roll a bottom; on the contrary, it lies upon it in a very irregular manner, and winds off now from one side of the cone, and then from the other. This whole thread, if measured, will be found about three hundred yards long; and so very fine, that eight or ten of them are generally rolled off into one by the manufacturers. The cone, when completed, is in form like a pigeon's egg, and more pointed at one end than the other; at the smaller end, the head of the aurelia is generally found; and this is the place that the insect, when converted into a moth, is generally seen to burst through.

It is generally a fortnight or three weeks before the aurelia is changed into a moth; but no sooner is the winged insect completely formed, than having divested itself of its aurelia skin, it prepares to burst through its cone, or outward prison: for this purpose it extends its

head towards the point of the cone, but with its eyes, which are rough, against the lining of its cell, wears it away, and at last pushes forward, through a passage which is small at first, but which enlarges as the animal increases its efforts for emancipation; while the tattered remnants of its aurelia skin lie in confusion within the cone, like a bundle of dirty linen.

The animal, when thus set free from its double confinement, appears exhausted with fatigue, and seems produced for no other purpose but to transmit a future brood. It neither flies nor eats; the male only seeking the female, whose eggs he impregnates; and their union continues for four days, without interruption. The male dies immediately after separation from his mate; and she survives him only till she has laid her eggs, which are not hatched into worms till the ensuing spring.

However, there are few of these animals suffered to come to a state of maturity; for as their bursting through the cone destroys the silk, the manufacturers take care to kill the aurelia, by exposing it to the sun, before the moth comes to perfection. This done, they take off the floss, and throw the cones into warm water, stirring them till the first thread offers them a clue for winding all off. They generally take eight of

the filken threads together; the cones still kept under water, till a proper quantity of the silk is wound off: however, they do not take all; for the latter parts grow weak, and are of a bad colour. As to the paper-like substance which remains, some stain it with a variety of colours, to make artificial flowers, others let it lie in the water, till the glutinous matter which cements it is all dissolved: it is then carded like wool, spun with a wheel, and converted into silk stuffs of an inferior kind.

PART IV.

AN

HISTORY

OF

INSECTS.

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

I
pi
w
in
T
m
re
fo
th
a
w
in
th
to
u
p
w
n
w

a
a

C H A P. I.

Of the Fourth Order of INSECTS.

IN the foregoing part we treated of caterpillars changing into butterflies; in the present will be given the history of grubs changing into their corresponding winged animals.—These, like the former, undergo their transformation, and appear as grubs or maggots, as aurelias, and at last as winged insects. Like the former, they are bred from eggs; they feed in their reptile state; they continue motionless and lifeless, as aurelias; and fly and propagate, when furnished with wings. But they differ in many respects: the grub or maggot wants the number of feet which the caterpillar is seen to have; the aurelia is not so totally wrapped up, but that its feet and its wings appear. The perfect animal, when emancipated, also has its wings either cased, or transparent, like gauze; not coloured with that beautifully painted dust which adorns the wings of the butterfly.

In this class of insects, therefore, we may place a various tribe, that are first laid as eggs, then are excluded as maggots or grubs, then change

into aurelias, with their legs and wings not wrapped up, but appearing; and lastly, assuming wings, in which state they propagate their kind. Some of these have four transparent wings, as bees; some have two membranous cases to their wings, as beetles; and some have but two wings, which are transparent, as ants. Here, therefore, we will place the bee, the wasp, the humble bee, the ichneumon fly, the gnat, the tipula or longlegs, the beetle, the may-bug, the glow-worm, and the ant. The transformations which all these undergo, are pretty nearly similar; and though very different animals in form, are yet produced nearly in the same manner.

CHAP. II.

Of the BEE.

TO give a complete history of this insect in a few pages, which some have exhausted volumes in describing, and whose nature and properties still continue in dispute, is impossible. It will be sufficient to give a general idea of the animal's operations; which, though they have been studied for more than two thousand years, are still but incompletely known. The account given us by Reaumur is sufficiently minute; and, if true, sufficiently wonderful: but I find many of the facts which he relates, doubted by those who are most conversant with bees; and some of them actually declared not to have a real existence in Nature.

It is unhappy, therefore, for those whose method demands an history of bees, that they are unfurnished with those materials which have induced so many observers to contradict so great a naturalist. His life was spent in the contemplation; and it requires an equal share of attention, to prove the error of his discoveries. Without entering, therefore, into the dispute, I will take him for my guide; and just mention,

as I go along, those particulars in which succeeding observers have begun to think him erroneous. Which of the two are right, time only can discover; for my part I have only heard one side, for as yet none have been so bold as openly to oppose Reaumur's delightful researches.

There are three different kinds of bees in every hive. First, the labouring bees, which make up the far greatest number, and are thought to be neither male nor female, but merely born for the purposes of labour, and continuing the breed, by supplying the young with provision, while yet in their helpless state. The second sort are the drones; they are of a darker colour, longer, and more thick by one third than the former; they are supposed to be the males; and there is not above a hundred of them, in a hive of seven or eight thousand bees. The third sort is much larger than either of the former, and still fewer in number: some assert, that there is not above one in every swarm; but this later observers affirm not to be true, there being sometimes five or six in the same hive. These are called queen bees, and are said to lay all the eggs from which the whole swarm is hatched in a season.

In examining the structure of the common working bee, the first remarkable part that

offers is the trunk, which serves to extract the honey from flowers. It is not formed, like that of other flies, in the manner of a tube, by which the fluid is to be sucked up; but like a besom, to sweep, or a tongue, to lick it away. The animal is furnished also with teeth, which serve it in making wax. This substance is gathered from flowers, like honey; it consists of that dust or farina which contribute to the fecundation of plants, and is moulded into wax by the little animal, at leisure. Every bee, when it leaves the hive to collect this precious store, enters into the cup of the flower, particularly such as seem charged with the greatest quantities of this yellow farina. As the animal's body is covered over with hair, it rolls itself within the flower, and soon becomes quite covered with the dust, which it soon after brushes off with its two hind legs, and kneads into two little balls. In the thighs of the hind legs there are two cavities, edged with hair; and into these, as into a basket, the animal sticks its pellets. Thus employed, the bee flies from flower to flower, increasing its store, and adding to its stock of wax; until the ball, upon each thigh, becomes as big as a grain of pepper: by this time, having got a sufficient load, it returns, making the best of its way to the hive,

The belly of the bee is divided into six rings, which sometimes shorten the body, by slipping one over the other. It contains within it, beside the intestines, the honey-bag, the venom-bag, and the sting. The honey-bag is as transparent as crystal, containing the honey that the bee has brushed from the flowers; of which the greater part is carried to the hive, and poured into the cells of the honey-comb; while the remainder serves for the bee's own nourishment: for, during summer, it never touches what has been laid up for the winter. The sting, which serves to defend this little animal from its enemies, is composed of three parts; the sheath, and two darts, which are extremely small and penetrating. Both the darts have several small points or barbs, like those of a fish-hook, which renders the sting more painful, and makes the darts rankle in the wound. Still, however, this instrument would be very slight, did not the bee poison the wound. The sheath, which has a sharp point, makes the first impression; which is followed by that of the darts, and then the venomous liquor is poured in. The sheath sometimes sticks so fast in the wound, that the animal is obliged to leave it behind; by which the bee soon after dies, and the wound is considerably inflamed. It might at first appear

well for mankind, if the bee were without its sting; but, upon recollection, it will be found, that the little animal would then have too many rivals in sharing its labours. An hundred other lazy animals, fond of honey, and hating labour, would intrude upon the sweets of the hive; and the treasure would be carried off, for want of armed guardians to protect it.

From examining the bee singly, we now come to consider it in society, as an animal not only subject to laws, but active, vigilant, laborious, and disinterested. - All its provisions are laid up for the community; and all its arts in building a cell, designed for the benefit of posterity. The substance with which bees build their cells is wax; which is fashioned into convenient apartments for themselves and their young. When they begin to work in their hives, they divide themselves into four companies: one of which roves in the fields in search of materials; another employs itself in laying out the bottom and partitions of their cells; a third is employed in making the inside smooth from the corners and angles; and the fourth company bring food for the rest, or relieve those who return with their respective burthens. But they are not kept constant to one employment; they often change the tasks assigned them;

those that have been at work, being permitted to go abroad; and those that have been in the fields already, take their places. They seem even to have signs, by which they understand each other; for when any of them wants food, it bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth, which is at that time opened to receive it. Their diligence and labour is so great, that, in a day's time, they are able to make cells, which lie upon each other, numerous enough to contain three thousand bees.

If we examine their cells, they will be found formed in the exactest proportion. It was said by Pappus, an ancient geometrician, that, of all other figures, hexagons were the most convenient; for, when placed touching each other, the most convenient room would be given, and the smallest lost. The cells of the bees are perfect hexagons: these, in every honeycomb, are double, opening on either side, and closed at the bottom. The bottoms are composed of little triangular panes, which, when united together, terminate in a point, and lie exactly upon the extremities of other panes of the same shape, in opposite cells. These lodgings have spaces, like streets, between them, large enough

to give the bees a free passage in and out; and yet narrow enough to preserve the necessary heat. The mouth of every cell is defended by a border, which makes the door a little less than the inside of the cell, which serves to strengthen the whole. These cells serve for different purposes: for laying up their young; for their wax, which in winter becomes a part of their food; and for their honey, which makes their principal subsistence.

It is well known that the habitation of bees ought to be very close; and what their hives want, from the negligence or unskilfulness of man, these animals supply by their own industry: so that it is their principal care, when first hived, to stop up all the crannies. For this purpose they make use of a resinous gum, which is more tenacious than wax, and differs greatly from it. This the ancients called *Propolis*: it will grow considerably hard in June; though it will in some measure soften by heat; and is often found different in consistence, colour, and smell. It has generally an agreeable aromatic odour when it is warmed; and by some it is considered as a most grateful perfume. When the bees begin to work with it, it is soft, but it acquires a firmer consistence every day; till at length it assumes a brown colour, and becomes much

harder than wax. The bees carry it on their hinder legs; and some think it is met with on the birch, the willow, and poplar. However it is procured, it is certain that they plaister the inside of their hives with this composition.

If examined through a glass hive, from the hurry the whole swarm is in, the whole at first appears like anarchy and confusion: but the spectator soon finds every animal diligently employed, and following one pursuit, with a settled purpose. Their teeth are the instruments by which they model and fashion their various buildings, and give them such symmetry and perfection. They begin at the top of the hive; and several of them work at a time, at the cells which have two faces. If they are stinted with regard to time, they give the new cells but half the depth which they ought to have; leaving them imperfect, till they have sketched out the number of cells necessary for the present occasion. The construction of their combs, cost them a great deal of labour: they are made by insensible additions; and not cast at once in a mould, as some are apt to imagine. There seems no end of their shaping, finishing, and turning them neatly up. The cells for their young are most carefully formed; those designed for lodging the drones, are larger than the rest;

and that for the queen-bee, the largest of all. The cells in which the young brood are lodged, serve at different times for containing honey; and this proceeds from an obvious cause: every worm, before it is transformed into an aurelia, hangs its old skin on the partitions of its cell; and thus, while it strengthens the wall, diminishes the capacity of its late apartment. The same cell, in a single summer, is often tenanted by three or four worms in succession; and the next season, by three or four more. Each worm takes particular care to fortify the pannels of its cell, by hanging up its spoils there: thus, the partitions being lined, six or eight deep, become at last too narrow for a new brood, and are converted into store-houses, for honey.

Those cells where nothing but honey is deposited, are much deeper than the rest. When the harvest of honey is so plentiful that they have not sufficient room for it, they either lengthen their combs, or build more; which are much longer than the former. Sometimes they work at three combs at a time; for when there are three work-houses, more bees may be thus employed, without embarrassing each other.

But honey, as was before observed, is not the only food upon which these animals subsist.

The meal of flowers, of which their wax is formed, is one of their most favourite repasts. This is a diet which they live upon during the summer; and of which they lay up a large winter provision. The wax of which their combs are made, is no more than this meal digested, and wrought into a paste. When the flowers upon which bees generally feed, are not fully blown, and this meal or dust is not offered in sufficient quantities, the bees pinch the tops of the stamina in which it is contained, with their teeth; and thus anticipate the progress of vegetation. In April and May, the bees are busy, from morning to evening, in gathering this meal; but when the weather becomes too hot in the midst of summer, they work only in the morning.

The bee is furnished with a stomach for its wax, as well as its honey. In the former of the two, their powder is altered, digested, and concocted into real wax; and is thus ejected by the same passage by which it was swallowed. Every comb, newly made, is white: but it becomes yellow as it grows old, and almost black when kept too long in the hive. Beside the wax thus digested, there is a large portion of the powder kneaded up for food in every hive, and kept in separate cells, for winter provision;

This is called, by the country people, bee-breed; and contributes to the health and strength of the animal during winter. Those who rear bees, may rob them of their honey, and feed them, during the winter, with treacle; but no proper substitute has yet been found for the bee-bread; and, without it, the animals become consumptive and die.

As for the honey, it is extracted from that part of the flower called the nectareum. From the mouth this delicious fluid passes into the gullet; and then into the first stomach, or honey-bag, which, when filled, appears like an oblong bladder. Children, that live in country places, are well acquainted with this bladder; and destroy many bees to come at their store of honey. When a bee has sufficiently filled its first stomach, it returns back to the hive, where it disgorges the honey into one of the cells. It often happens that the bee delivers its store to some other, at the mouth of the hive, and flies off for a fresh supply. Some honey-combs are always left open for common use; but many others are stopped up, till there is a necessity of opening them. Each of these are covered carefully with wax; so close, that the covers seem to be made at the very instant the fluid is deposited within them.

Having thus given a cursory description of the insect, individually considered, and of the habitation it forms; we next come to its social habits and institutions: and, in considering this little animal attentively, after the necessary precautions for the immediate preservation of the community, its second care is turned to the continuance of posterity. How numerous soever the multitude of bees may appear in one swarm, yet they all owe their original to a single parent, which is called the *Queen-Bee*. It is indeed surprising that a single insect shall, in one summer, give birth to above twenty thousand young: but, upon opening her body, the wonder will cease; as the number of eggs appearing, at one time, amounts to five thousand. This animal, whose existence is of such importance to her subjects, may easily be distinguished from the rest, by her size, and the shape of her body. On her safety depends the whole welfare of the commonwealth; and the attentions paid her by all the rest of the swarm, evidently shew the dependence her subjects have upon her security. If this insect be carefully observed, she will be seen at times attended with a numerous retinue, marching from cell to cell, plunging the extremity of her body into many of them, and leaving a small egg in each.

The bees which generally compose her train, are thought to be males, which serve to impregnate her by turns. These are larger and blacker than the common bees; without stings, and without industry. They seem formed only to transmit a posterity; and to attend the queen, whenever she thinks proper to issue from the secret retreats of the hive, where she most usually resides. Upon the union of these two kinds depends all expectations of a future progeny; for the working bees are of no sex, and only labour for another offspring: yet such is their attention to their queen, that if she happens to die, they will leave off working, and take no farther care of posterity. If, however, another queen is in this state of universal despair presented them, they immediately acknowledge her for sovereign, and once more diligently apply to their labour. It must be observed, however, that all this fertility of the queen-bee, and the great attentions paid to her by the rest, are controverted by more recent observers. They assert, that the common bees are parents themselves; that they deposite their eggs in the cells which they have prepared; that the females are impregnated by the males, and bring forth a progeny, which is wholly their own.

However, to go on with their history, as

delivered us by Mr. Reaumur—When the queen-bee has deposited the number of eggs necessary in the cells, the working bees undertake the care of the rising posterity. They are seen to leave off their usual employments; to construct proper receptacles for eggs; or to complete those that are already formed. They purposely build little cells, extremely solid, for the young; in which they employ a great deal of wax: those designed for lodging the males, as was already observed, are larger than the rest; and those for the queen-bees the largest of all. There is usually but one egg deposited in every cell; but when the fecundity of the queen is such, that it exceeds the number of cells already prepared, there are sometimes three or four eggs crowded together in the same apartment. But this is an inconvenience that the working bees will by no means suffer. They seem sensible that, two young ones, stuffed up in the same cell, when they grow larger, will but embarrass, and at last destroy each other: they therefore take care to leave a cell to every egg; and remove, or destroy the rest.

The single egg that is left remaining, is fixed to the bottom of the cell, and touches it but in a single point. A day or two after it is deposited, the worm is excluded from the shell of

THE BEE.

the egg, having the appearance of a maggot rolled up in a ring, and lying softly on a bed of a whitish coloured jelly; upon which also the little animal begins to feed. In the mean time, the instant it appears, the working bees attend it with the most anxious and parental tenderness; they furnish it every hour with a supply of this whitish substance, on which it feeds and lies; and watch the cell with unremitting care. They are nurses that have a greater affection for the offspring of others, than many parents have for their own children. They are constant in visiting each cell, and seeing that nothing is wanting; preparing the white mixture, which is nothing but a composition of honey and wax, in their own bowels, with which they feed them. Thus attended, and plentifully fed, the worm, in less than six days time, comes to its full growth, and no longer accepts the food offered it. When the bees perceive that it has no further occasion for feeding, they perform the last offices of tenderness, and shut the little animal up in its cell; walling up the mouth of its apartment with wax: there they leave the worm to itself; having secured it from every external injury.

The worm is no sooner left inclosed, but, from a state of inaction, it begins to labour,

extending and shortening its body; and by this means lining the walls of its apartment with a filken tapestry, which it spins in the manner of caterpillars, before they undergo their last transformation. When their cell is thus prepared, the animal is soon after transformed into an aurelia; but differing from that of the common caterpillar, as it exhibits not only the legs, but the wings of the future bee, in its present state of inactivity. Thus, in about twenty, or one and twenty days after the egg was laid, the bee is completely formed, and fitted to undergo the fatigues of its state. When all its parts have acquired their proper strength and consistence, the young animal opens its prison, by piercing with its teeth the waxen door that confines it. When just freed from its cell, it is as yet moist, and incommoded with the spoils of its former situation; but the officious bees are soon seen to flock round it, and to lick it clean on all sides with their trunks; while another band, with equal assiduity, are observed to feed it with honey: others again begin immediately to cleanse the cell that has been just left; to carry the ordures out of the hive, and to fit the place for a new inhabitant. The young bee soon repays their care, by its industry; for as soon as ever its external parts become dry, it discovers its na-

tural appetites for labour, and industriously begins the task, which it pursues unremittingly through life. The toil of man is irksome to him, and he earns his subsistence with pain; but this little animal seems happy in its pursuits, and finds delight in all its employments.

When just freed from the cell, and properly equipped by its fellow bees for duty, it at once issues from the hive, and instructed only by Nature, goes in quest of flowers, chooses only those that yield it a supply, rejects such as are barren of honey, or have been already drained by other adventurers; and when loaded, is never at a loss to find its way back to the common habitation. After this first sally, it begins to gather the mealy powder, that lies on every flower, which is afterwards converted into wax; and with this, the very first day, it returns with two large balls stuck to its thighs.

When bees first begin to break their prisons, there are generally above an hundred excluded in one day. Thus, in the space of a few weeks, the number of the inhabitants in one hive, of moderate size, becomes so great, that there is no place to contain the new comers; and they are scarcely excluded from the cell, when they are obliged, by the old bees, to sally forth in quest of new habitations. In other words, the

hive begins to swarm, and the new progeny prepares for exile.

While there is room enough in the hive, the bees remain quietly together; it is necessity alone that compels the separation. Sometimes, indeed, the young brood, with graceless obstinacy, refuse to depart, and even venture to resist their progenitors. The young ones are known by being browner than the old, with whiter hair; the old ones are of a lighter colour, with red hair. The two armies are therefore easily distinguishable, and dreadful battles are often seen to ensue. But the victory almost ever terminates with strict poetical justice in favour of the veterans, and the rebellious offspring are driven off, not without loss and mutilation.

In different countries, the swarms make their appearance at different times of the year, and there are several signs previous to this intended migration. The night before, an unusual buzzing is heard in the hive; in the morning, though the weather be soft and inviting, they seem not to obey the call, being intent on more important meditations within. All labour is discontinued in the hive, every bee is either employed in forcing, or reluctantly yielding a submission; at length, after some

noise and tumult, a queen bee is chosen to guard rather than conduct the young colony to other habitations, and then they are marshalled without any apparent conductor. In less than a minute they leave their native abode, and forming a cloud round their protectress, they set off without seeming to know the place of their destination; *The world before them, where to choose their place of rest.* The usual time of swarming is from ten in the morning to three in the afternoon, when the sun shines bright, and invites them to seek their fortunes. They flutter for a while in the air, like flakes of snow, and sometimes undertake a distant journey, but more frequently are contented with some neighbouring asylum; the branch of a tree, a chimney-top, or some other exposed situation. It is, indeed, remarkable, that all those animals, of whatever kind, that have long been under the protection of man, seem to lose a part of their natural sagacity, in providing for themselves. The rabbit, when domesticated, forgets to dig holes, the hen to build a nest, and the bee to seek a shelter, that shall protect it from the inclemencies of winter. In those countries, where the bees are wild, and unprotected by man, they are always sure to build their waxen cells in the hollow of a tree; but with us, they seem im-

provident in their choice, and the first green branch that stops their flight, seems to be thought sufficient for their abode through winter. However, it does not appear, that the queen chooses the place where they are to alight; for many of the stragglers, who seem to be pleased with a particular branch, go and settle upon it; others are seen to succeed, and at last, the queen herself, when she finds a sufficient number there before her, goes to make it the place of her head quarters. When the queen is settled, the rest of the swarm soon follow; and, in about a quarter of an hour, the whole body seem to be at ease. It sometimes is found, that there are two or three queens to a swarm, and the colony is divided into parties; but it most usually happens, that one of these is more considerable than the other, and the bees by degrees, desert the weakest, to take shelter under the most powerful protector. The deserted queen does not long survive this defeat; she takes refuge under the new monarch, and is soon destroyed by her jealous rival. Till this cruel execution is performed, the bees never go out to work; and if there should be a queen bee belonging to the new colony left in the old hive, she always undergoes the fate of the former. However, it must

be observed, that the bees never sacrifice any of their queens, when the hive is full of wax and honey; for there is at that time, no danger in maintaining a plurality of breeders.

When the swarm is thus conducted to a place of rest, and the policy of government is settled, the bees soon resume their former labours. The making cells, storing them with honey, impregnating the queen, making proper cells for the reception of the rising progeny, and protecting them from external danger, employ their unceasing industry. But soon after, and towards the latter end of summer, when the colony is sufficiently stored with inhabitants, a most cruel policy ensues. The drone bees, which are (as has been said) generally in a hive, to the number of an hundred, are marked for slaughter. These, which had hitherto led a life of indolence and pleasure, whose only employment was in impregnating the queen, and rioting upon the labours of the hive, without aiding in the general toil, now share the fate of most voluptuaries, and fall a sacrifice to the general resentment of society.

The working bees, in a body, declare war against them; and in two or three days time, the ground all round the hive is covered with their dead bodies. Nay, the working bees

will even kill such drones, as are yet in the worm state, in the cell, and eject their bodies from the hive, among the general carnage.

When a hive sends out several swarms in the year, the first is always the best, and the most numerous. These, having the whole summer before them, have the more time for making wax and honey, and consequently their labours are the most valuable to the proprietor. Although the swarm chiefly consists of the youngest bees, yet it is often found, that bees of all ages compose the multitude of emigrants, and it often happens, that bees of all ages are seen remaining behind. The number of them is always more considerable than that of some populous cities, for sometimes upwards of forty thousand are found in a single hive. So large a body may well be supposed to work with great expedition; and in fact, in less than twenty-four hours, they will make combs above twenty inches long, and seven or eight broad. Sometimes they will half fill their hives with wax, in less than five days. In the first fifteen days, they are always found to make more wax than they do afterwards during the rest of the year.

Such are the out-lines of the natural history of these animals, as usually found in our own

country. How they are treated, so as to produce the greatest quantity of honey, belongs rather to the rural œconomist, than the natural historian; volumes have been written on the subject, and still more remains equally curious and new. One thing, however, it may be proper to observe, that a farm, or a country, may be over-stocked with bees, as with any other sort of animal; for a certain number of hives, always require a certain number of flowers to subsist on. When the flowers near home are rifled, then are these industrious insects seen taking more extensive ranges, but their abilities may be over-taxed; and if they are obliged, in quest of honey, to go too far from home, they are over-wearied in the pursuit, they are devoured by birds, or beat down by the winds and rain.

From a knowledge of this, in some parts of France and Piedmont, they have contrived, as I have often seen, a kind of floating bee-house.

They have on board one barge, threescore or an hundred bee-hives, well defended from the inclemency of an accidental storm; and with these the owners suffer themselves to float gently down the river. As the bees are continually choosing their flowery pasture along the banks of the stream, they are furnished with sweets before unrifled; and thus a single float-

ing bee-house, yields the proprietor a considerable income. Why a method similar to this has never been adopted in England, where we have more gentle rivers, and more flowery banks, than in any other part of the world, I know not; certainly it might be turned to advantage, and yield the possessor a secure, though perhaps a moderate income.

Having mentioned the industry of these admirable insects, it will be proper to say something of the effects of their labour, of that wax and honey, which are turned by man to such various uses. Bees gather two kinds of wax, one coarse and the other fine. The coarser sort is bitter, and with this, which is called *propolis*, they stop up all the holes and crevices of their hives. It is of a more resinous nature than the fine wax, and is consequently better qualified to resist the moisture of the season, and preserve the works warm and dry within. The fine wax is as necessary to the animal's preservation as the honey itself. With this they make their lodgings, with this they cover the cells of their young, and in this they lay up their magazines of honey. This is made, as has been already observed, from the dust of flowers, which is carefully kneaded by the little insect, then swallowed, and having undergone a kind of di-

gestion, is formed into the cells, which answers such a variety of purposes. To collect this, the animal rolls itself in the flower it would rob, and thus takes up the vegetable dust with the hair of its body. Then carefully brushing it into a lump, with its fore paws it thrusts the composition into two cavities behind the thighs, which are made like spoons to receive the wax, and the hair that lines them, serves to keep it from falling.

As of wax, there are also two kinds of honey: The white and the yellow. The white is taken without fire from the honey-combs. The yellow is extracted by heat, and squeezed through bags, in a press. The best honey is new, thick, and granulated, of a clear transparent white colour, of a soft and aromatic smell, and of a sweet lively taste. Honey made in mountainous countries, is preferable to that of the valley. The honey made in the spring, is more highly esteemed, than that gathered in summer, which last is still more valuable, than that of autumn, when the flowers begin to fade and lose their fragrance.

The bees are nearly alike in all parts of the world, yet there are differences worthy our notice. In Guadaloupe, the bee is less by one half, than the European, and more black and

round. They have no sting, and make their cells in hollow trees; where, if the hole they meet with is too large, they form a sort of waxen house, of the shape of a pear, and in this they lodge and store their honey, and lay their eggs. They lay up their honey in waxen vessels, of the size of a pigeon's egg, of a black or deep violet colour; and these are so joined together, that there is no space left between them. The honey never congeals, but is fluid, of the consistence of oil, and the colour of amber. Resembling these, there are found little black bees, without a sting, in all the tropical climates; and though these countries are replete with bees, like our own, yet these form the most useful and laborious tribe in that part of the world. The honey they produce, is neither so unpalatable, nor so surfeiting as ours; and the wax is so soft, that it is only used for medicinal purposes, it being never found hard enough to form into candles, as in Europe.

Of insects, that receive the name of bees, among us, there are several; which, however, differ very widely from that industrious, social race we have been just describing. The HUMBLE BEE is the largest of all this tribe, being as large as the first joint of one's middle finger. These are seen in every field, and perched on

every flower. They build their nest in holes in the ground, of dry leaves, mixed with wax and wool, defended with moss from the weather. Each humble bee makes a separate cell about the size of a small nutmeg, which is round and hollow, containing the honey in a bag. Several of these cells are joined together, in such a manner, that the whole appears like a cluster of grapes. The females, which have the appearance of wasps, are very few, and their eggs are laid in cells, which the rest soon cover over with wax. It is uncertain whether they have a queen or not; but there is one much larger than the rest, without wings, and without hair, and all over black, like polished ebony. This goes and views all the works, from time to time, and enters into the cell, as if it wanted to see whether every thing was done right: In the morning, the young humble bees are very idle, and seem not at all inclined to labour, till one of the largest, about seven o'clock, thrusts half its body from a hole, designed for that purpose, and seated on the top of the nest, beats its wings for twenty minutes successively, buzzing the whole time, till the whole colony is put in motion. The humble bees gather honey, as well as the com-

mon bees; but it is neither so fine, nor so good, nor the wax so clean, or so capable of fusion.

Besides the bees already mentioned, there are various kinds among us, that have much the appearance of honey-makers, and yet make only wax. The WOOD-BEE is seen in every garden. It is rather larger than the common queen-bee; its body of a blueish black, which is smooth and shining. It begins to appear at the approach of spring, and is seen flying near walls exposed to a sunny aspect. This bee makes its nest in some piece of wood, which it contrives to scoop and hollow for its purpose. This, however is never done in trees that are standing, for the wood it makes choice of is half rotten. The holes are not made directly forward, but turning to one side, and have an opening sufficient to admit one's middle finger; from whence runs the inner apartment, generally twelve or fifteen inches long. The instruments used in boring these cavities, are their teeth; the cavity is usually branched into three or four apartments; and in each of these, they lay their eggs, to the number of ten or twelve, each separate and distinct from the rest: The egg is involved in a sort of paste, which serves at once for the young animal's protection

and nourishment. The grown bees, however, feed upon small insects, particularly a louse, of a reddish brown colour, of the size of a small pin's head.

MASON BEES make their cells with a sort of mortar, made of earth, which they build against a wall that is exposed to the sun. The mortar, which at first is soft, soon becomes as hard as stone, and in this their eggs are laid. Each nest contains seven or eight cells, an egg in every cell, placed regularly one over the other. If the nest remains unhurt, or wants but little repairs, they make use of them the year ensuing: and thus they often serve three or four years successively. From the strength of their houses, one would think these bees in perfect security, yet none are more exposed than they. A worm with very strong teeth, is often found to bore into their little fortifications, and devour their young.

The GROUND BEE builds its nest in the earth, wherein they make round holes, five or six inches deep; the mouth being narrow, and only just sufficient to admit the little inhabitant. It is amusing enough, to observe the patience and assiduity with which they labour. They carry out all the earth, grain by grain, to the mouth of the hole, where it forms a little

hillock, an Alps compared to the power of the artist by which it is raised. Sometimes the walks of a garden are found undermined by their labours; some of the holes running directly downward, others horizontally beneath the surface. They lay up in these cavities provisions for their young, which consist of a paste that has the appearance of corn, and is of a sweetish taste.

The LEAF-CUTTING BEES make their nest and lay their eggs among bits of leaves, very artificially placed in holes in the earth, of about the length of a tooth-pick case. They make the bits of leaves of a roundish form, and with them line the inside of their habitations. This tapestry is still further lined by a reddish kind of paste, somewhat sweet or acid. These bees are of various kinds; those that build their nests with chestnut-leaves are as big as drones, but those of the rose-tree are smaller than the common bee.

The WALL BEES are so called, because they make their nests in walls of a kind of silky membrane with which they fill up the vacuities between the small stones which form the sides of their habitation. Their apartment consists of several cells placed end to end, each in the shape of a woman's thimble. Though the

web
warm
colou
from
are o
sting.
be ad
in nat
excit

web which lines this habitation is thick and warm, yet it is transparent and of a whitish colour. This substance is supposed to be spun from the animal's body. The male and females are of a size, but the former are without a sting. To these varieties of the bee kind might be added several others which are all different in nature, but not sufficiently distinguished to excite curiosity.

C H A P. III.

Of the WASP.

HOWEVER similar many insects may be in appearance, this does not imply a similitude in their history. The bee and the wasp resemble each other very strongly, yet, in examining their manner and their duration, they differ very widely; the bee labours to lay up honey, and lives to enjoy the fruits of its industry; the wasp appears equally assiduous, but only works for posterity, as the habitation is scarcely completed when the inhabitant dies.

The wasp is well known to be a winged insect with a sting. To be longer in proportion to its bulk than the bee, to be marked with bright yellow circles round its body, and to be the most swift and active insect of all the fly kind. On each side of the mouth this animal is furnished with a long tooth, notched like a saw, and with these it is enable to cut any substance, not omitting meat itself, and to carry it to its nest. Wasps live like bees in community, and sometimes ten or twelve thousand are found inhabiting a single nest.

Of all other insects the wasp is the most fierce, voracious, and most dangerous, when enraged. They are seen wherever flesh is cutting up, gorging themselves with the spoil, and then flying to their nests with their reeking prey. They make war also on every other fly, and the spider himself dreads their approaches.

Every community among bees is composed of females or queens, drones or males, and neutral or working bees. Wasps have similar occupations; the two first are for propagating the species, the last for nursing, defending, and supporting the rising progeny. Among bees however, there is seldom above a queen or two in an hive; among wasps there are above two or three hundred.

As soon as the summer begins to invigorate the insect tribes, the wasps are the most of the number, and diligently employed either in providing provisions for their nest, if already made, or in making one, if the former habitation be too small to receive the increasing community. The nest is one of the most curious objects in natural history, and contrived almost as artificially as that of the bees themselves. Their principal care is to seek out an hole that has been begun by some other ani-

mal, a field mouse, a rat, or a mole, to build their nests in. They sometimes build upon the plain, where they are sure of the dryness of their situation, but most commonly on the side of a bank to avoid the rain or water that would otherwise annoy them. When they have chosen a proper place they go to work with wonderful assiduity. Their first labour is to enlarge and widen the hole, taking away the earth and carrying it off to some distance. They are perfectly formed for labour, being furnished with a trunk above their mouths, two saws on each side which play to the right and left against each other, and six strong muscular legs to support them. They cut the earth into small parcels with their saws, and carry it out with their legs or paws. This is the work of some days; and at length the outline of their habitation is formed, making a cavity of about a foot and an half every way. While some are working in this manner, others are roving the fields to seek out materials for their building. To prevent the earth from falling down and crushing their rising city into ruin, they make a sort of roof with their gluey substance, to which they begin to fix the rudiments of their building, working from the top downwards, as if they were hanging a

bell, which, however at length they close up at the bottom. The materials with which they build their nests are bits of wood and glue. The wood they get where they can from the rails and posts which they meet with in the fields and elsewhere. These they saw and divide into a multitude of small fibres, of which they take up little bundles in their claws, letting fall upon them a few drops of gluey matter with which their bodies are provided, by the help of which they knead the whole composition into a paste, which serves them in their future building. When they have returned with this to their nest, they stick their load of paste on that part where they make their walls and partitions; they tread it close with their feet, and trowel it with their trunks, still going backwards as they work. Having repeated this operation three or four times, the composition is at length flatted out until it becomes a small leaf of a grey colour, much finer than paper, and of a pretty firm texture. This done the same wasp returns to the field to collect a second load of paste, repeating the same several times, placing layer upon layer, and strengthening every partition in proportion to the wants or convenience of the general fabric. Other working wasps come quickly after to repeat the

same operation, laying more leaves upon the former, till at length, after much toil, they have finished the large roof which is to secure them from the tumbling in of the earth. This dome being finished, they make another entrance to their habitation, designed either for letting in the warmth of the sun, or for escaping in case one door be invaded by plunderers. Certain however it is, that by one of these they always enter, by the other they sally forth to their toil; each hole being so small that they can pass but one at a time. The walls being thus composed, and the whole somewhat of the shape of a pear, they labour at their cells, which they compose of the same paper like substance that goes to the formation of the outside works. Their combs differ from those of bees, not less in the composition than the position which they are always seen to obtain. The honeycomb of the bee is edgeways with respect to the hive; that of the wasp is flat, and the mouth of every cell opens downwards. Thus is their habitation, contrived story above story, supported by several rows of pillars which give firmness to the whole building, while the upper story is flat-roofed, and as smooth as the pavement of a room, laid with squares of marble. The wasps can freely walk upon these stories

between the pillars to do whatever their wants require. The pillars are very hard and compact, being larger at each end than in the middle, not much unlike the columns of a building. All the cells of the nest are only destined for the reception of the young, being replete with neither wax nor honey.

Each cell is like that of the bee, hexagonal; but they are of two sorts, the one larger for the production of the male and female wasps, the other less for the reception of the working part of the community. When the females are impregnated by the males, they lay their eggs, one in each cell, and stick it in with a kind of gummy matter to prevent its falling out. From this egg proceeds the insect in its worm-state, of which the old ones are extremely careful, feeding it from time to time till it becomes large, and entirely fills up its cell. But the wasp community differs from that of the bee in this; that among the latter the working bees take the parental duties upon them, whereas among the wasps the females alone are permitted to feed their young, and to nurse their rising progeny. For this purpose the female waits with great patience till the working wasps have brought in their provisions, which she takes from them, and cuts into pieces. She then goes

with great compofure from cell to cell, and feeds every young one with her mouth. When the young worms have come to a certain fize they leave off eating, and begin to fpin a very fine filk, fixing the firft end to the entrance of the cell, then turning their heads, firft on one fide, then on the other, they fix the thread to different parts, and thus they make a fort of a door which ferves to clofe up the mouth of the cell. After this they divest themfelves of their fkins after the ufual mode of transformation, the aurelia by degrees begins to emancipate itfelf from its fhell; by little and little it thrufts out its legs and wings, and infenfibly acquires the colour and fhape of its parent.

The wasp thus formed, and prepared for depredation, becomes a bold, troublefome, and dangerous infect: there are no dangers which it will not encounter in purfuit of its prey, and nothing feems to fatisfy its gluttony. Though it can gather no honey of its own, no animal is more fond of fweets. For this purpofe it will purfue the bee and the humble bee, deftroy them with its fting, and then plunder them of their honey-bag, with which it flies triumphantly loaded to its neft to regale its young. Wasps are ever fond of making their nefts in the neighbourhood of bees, merely to

have an opportunity of robbing their hives, and feasting on the spoil. Yet the bees are not found always patiently submissive to their tyranny, but fierce battles are sometimes seen to ensue, in which the bees make up by conduct and numbers what they want in personal prowess. When there is no honey to be had, they seek for the best and sweetest fruits, and they are never mistaken in their choice. From the garden they fly to the city, to the grocers shops, and butchers shambles. They will sometimes carry off bits of flesh half as big as themselves, with which they fly to their nests for the nourishment of their brood. Those who cannot drive them away, lay for them a piece of ox's liver, which being without fibres, they prefer to other flesh; and whenever they are found, all other flies are seen to desert the place immediately. Such is the dread with which these little animals impress all the rest of the insect tribes, which they seize and devour without mercy, that they vanish at their approach. Wherever they fly, like the eagle or the falcon, they form a desert in the air around them. In this manner the summer is passed in plundering the neighbourhood, and rearing up their young; every day adds to their numbers; and from their strength, agility, and indiscriminate appetite for every kind of pro-

vision, were they as long lived as the bee, they would soon swarm upon the face of Nature, and become the most noxious plague of man; but providentially their lives are measured to their mischief, and they live but a single season.

While the summer heats continue, they are bold, voracious, and enterprising; but as the sun withdraws, it seems to rob them of their courage and activity. In proportion as the cold increaseth, they are seen to become more domestic; they seldom leave the nest, they make but short adventures from home, they flutter about in the noon-day heats, and soon after return chilled and feeble.

As their calamities increase, new passions soon begin to take place; the care for posterity no longer continues, and as the parents are no longer able to provide their growing progeny a supply, they take the barbarous resolution of sacrificing them all to the necessity of the times. In this manner, like a garrison upon short allowance, all the useless hands are destroyed; the young worms, which a little before they fed and protected with so much assiduity, are now butchered and dragged from their cells. As the cold increases they no longer find sufficient warmth in their nests, which grow hateful to them, and they fly to

seek it in the corners of houses, and places that receive an artificial heat. But the winter is still insupportable; and, before the new year begins, they wither and die; the working wasps first, the males soon following, and many of the females suffering in the general calamity. In every nest, however, one or two females survive the winter, and having been impregnated by the male during the preceding season, she begins in spring to lay her eggs in a little hole of her own contrivance. This bundle of eggs, which is clustered together like grapes, soon produces two worms which the female takes proper precaution to defend and supply, and these when hatched soon give assistance to the female, who is employed in hatching two more; these also gathering strength, extricate themselves out of the web that enclosed them, and become likewise assistants to their mother; fifteen days after, two more make their appearance; thus is the community every day increasing, while the female lays in every cell, first a male and then a female. These soon after become breeders in turn, till, from a single female, ten thousand wasps are seen produced before the month of June. After the female has thus produced her progeny, which are distributed in different districts, they assemble from all parts,

in the middle of summer, and provide for themselves the large and commodious habitation, which has been described above.

Such is the history of the social wasp; but, as among bees, so also among these insects, there are various tribes that live in solitude: these lay their eggs in a hole for the purpose, and the parent dies long before the birth of its offspring. In the principal species of the SOLITARY WASPS, the insect is smaller than the working wasp of the social kind. The filament, by which the corselet is joined to the body, is longer and more distinctly seen, and the whole colour of the insect is blacker than in the ordinary kinds. But it is not their figure, but the manners of this extraordinary insect that claim our principal regard.

From the end of May to the beginning of July, this wasp is seen most diligently employed. The whole purpose of its life seems to be in contriving and fitting up a commodious apartment for its young one, which is not to succeed it till the year ensuing. For this end it is employed, with unwearied assiduity in boring a hole into the finest earth some inches deep, but not much wider than the diameter of its own body. This is but a gallery leading to a wider apartment destined for the con-

venient lodgment of its young. As it always chooses a gravelly soil to work in, and where the earth is almost as hard as stone itself; the digging and hollowing this apartment is an enterprise of no small labour; for effecting its operations, this insect is furnished with two teeth, which are strong and firm, but not sufficiently hard to penetrate the substance through which it is resolved to make its way. In order therefore to soften that earth which it is unable to pierce, it is furnished with a gummy liquor which it emits upon the place, and which renders it more easily separable from the rest, and the whole becoming a kind of soft paste is removed to the mouth of the habitation. The animal's provision of liquor in these operations is however soon exhausted; and it is then seen either taking up water from some neighbouring flower or stream in order to supply the deficiency.

At length, after much toil, a hole some inches deep is formed, at the bottom of which is a large cavity; and to this no other hostile insect would venture to find its way, from the length and the narrowness of the defile through which it would be obliged to pass. In this the solitary wasp lays its egg, which is destined to continue the species; there the nascent animal

is to continue for above nine months, unattended and immured, and at first appearance the most helpless insect of the creation. But when we come to examine, new wonders offer, no other insect can boast so copiously luxurious a provision, or such confirmed security.

As soon as the mother wasp has deposited her egg at the bottom of the hole, her next care is to furnish it with a supply of provisions, which may be offered to the young insect as soon as it leaves the egg. To this end she procures a number of little green worms, generally from eight to twelve, and these are to serve as food for the young one the instant it awakens into life. When this supply is regularly arranged and laid in, the old one then, with as much assiduity as it before worked out its hole, now closes the mouth of the passage; and thus leaving its young one immured in perfect security, and in a copious supply of animal food, she dies satisfied with having provided for a future progeny.

When the young one leaves the egg it is scarcely visible, and is seen immured among a number of insects, infinitely larger than itself, ranged in proper order around it, which, however give it no manner of apprehension. Whether the parent, when she laid in the insect

provision, contrived to disable the worms from resistance, or whether they were at first incapable of any, is not known. Certain it is, that the young glutton feasts upon the living spoil without any controul; his game lies at his hand, and he devours one after the other as the calls of appetite incite him. The life of the young animal is therefore spent in the most luxurious manner, till its whole stock of worms is exhausted, and then the time of its transformation begins to approach; and then spinning a silken web, it continues fixed in its cell till the sun calls it from its dark abode the ensuing summer.

The wasps of Europe are very mischievous, yet they are innocence itself when compared to those of the tropical climates, where all the insect tribes are not only numerous, but large, voracious, and formidable. Those of the West Indies are thicker, and twice as long as the common bee; they are of a grey colour, striped with yellow, and armed with a very dangerous sting. They make their cells in the manner of a honey-comb, in which the young ones are hatched and bred. They generally hang their nests by threads, composed of the same substance with the cells, to the branches of trees, and the eaves of houses. They are

seen every where in great abundance, descending like fruit, particularly pears, of which shape they are, and as large as one's head. The inside is divided into three round stories, full of cells, each hexagonal, like those of an honey-comb. In some of the islands these insects are so very numerous, that their nests are stuck up in this manner, scarce two feet asunder, and the inhabitants are in continual apprehension from their accidental resentment. It sometimes happens, that no precautions can prevent their attacks, and the pains of their sting is almost insupportable. Those who have felt it think it more terrible than even that of a scorpion; the whole visage swells, and the features are so disfigured, that a person is scarcely known by his most intimate acquaintance.

THE ICHNEUMON FLY. iii

CHAP. IV.

Of the ICHNEUMON FLY.

EVERY rank of insects, how voracious soever, have enemies that are terrible to them, and that revenge upon them the injuries done upon the rest of the Animated Creation. The wasp, as we have seen, is very troublesome to man, and very formidable to the insect tribe; but the ichneumon fly (of which there are many varieties) fears not the wasp itself, it enters its retreats, plunders its inhabitants, and takes possession of that cell for its own young, which the wasp had laboriously built for a dearer posterity.

Though there are many different kinds of this insect, yet the most formidable, and that best known, is called the common ichneumon, with four wings, like the bee, a long slender black body, and a three-forked tail, consisting of bristles; the two outermost black, and the middlemost red. This fly receives its name from the little quadrupede, which is found to be so destructive to the crocodile, as it bears a strong similitude in its courage and rapacity.

Though this instrument is, to all appearance, slender and feeble, yet it is found to be a weapon of great force and efficacy. There is scarce any substance which it will not pierce; and, indeed, it is seldom seen but employed in penetration. This is the weapon of defence, this is employed in destroying its prey, and still more, by this the animal deposits her eggs wherever she thinks fit to lay them. As it is an instrument chiefly employed for this purpose, the male is unprovided with such a sting, while the female uses it with great force and dexterity, brandishing it when caught, from side to side, and very often wounding those who thought they held her with the greatest security.

All the flies of this tribe are produced in the same manner, and owe their birth to the destruction of some other insect, within whose body they have been deposited, and upon whose vitals they have preyed, till they came to maturity. There is no insect whatever, which they will not attack, in order to leave their fatal present in its body; the caterpillar, the gnat, and even the spider himself, so formidable to others, is often made the unwilling fosterer of this destructive progeny.

About the middle of summer, when other insects are found in great abundance, the ich-

THE ICHNEUMON FLY. 113

neumon is seen flying busily about, and seeking proper objects upon whom to depose its progeny. As there are various kinds of this fly, so they seem to have various appetites. Some are found to place their eggs within the aurelia of some nascent insect, others place them within the nest, which the wasp had curiously contrived for its own young; and as both are produced at the same time, the young of the ichneumon, not only devours the young wasp, but the whole supply of worms, which the parent had carefully provided for its provision. But the greatest number of the ichneumon tribe are seen settling upon the back of the caterpillar, and darting, at different intervals, their stings into its body. At every dart they deposite an egg, while the wounded animal seems scarcely sensible of the injury it sustains. In this manner they leave from six to a dozen of their eggs, within the fatty substance of the reptile's body, and then fly off to commit further depredations. In the mean time the caterpillar thus irreparably injured, seems to feed as voraciously as before, does not abate of its usual activity; and to all appearance, seems no way affected by the internal enemies that are preparing its destruction in their darksome abode. But they soon burst from their egg state, and begin to prey upon

the substance of their prison. As they grow larger, they require a greater supply, till at last the animal, by whose vitals they are supported, is no longer able to sustain them, but dies; its whole inside being almost eaten away. It often happens, however, that it survives their worm state, and then they change into a chrysalis, inclosed in the caterpillar's body till the time of their delivery approaches, when they burst their prisons and fly away. The caterpillar, however, is irreparably destroyed, it never changes into a chrysalis, but dies shortly after, from the injuries it had sustained.

Such is the history of this fly, which though very terrible to the insect tribe, fails not to be of infinite service to mankind. The millions which it kills in a single summer, are inconceivable; and without such a destroyer, the fruits of the earth would only rise to furnish a banquet for the insect race, to the exclusion of all the nobler ranks of Animated Nature.

CHAP. V.

Of the ANT.

THOUGH the number of two-winged flies be very great, and the naturalists have taken some pains to describe their characters and varieties; yet there is such a similitude in their forms and manners, that in a work like this, one description must serve for all. We now therefore, come to a species of four-winged insects; that are famous from all antiquity, for their social and industrious habits; that are marked for their spirit of subordination, that are offered as a patron of parsimony to the profuse, and of unremitting diligence to the sluggard;

In the experiments, however, which have been more recently made, and the observations which have been taken, much of their boasted frugality and precaution seems denied them; the treasures they lay up, are no longer supposed intended for future provision, and the choice they make in their stores, seems no way dictated by wisdom. It is, indeed, somewhat surprising, that almost every writer of antiquity should describe this insect, as labouring in the summer, and feasting upon the produce

during the winter. Perhaps, in some of the warmer climates, where the winter is mild, and of short continuance, this may take place; but in France and England, these animals can have no manner of occasion for a supply of winter provisions, as they are actually in a state of torpidity during that season.

The common ants of Europe, are of two or three different kinds; some red, some black, some with stings, and others without. Such as have stings inflict their wounds in that manner; such as are unprovided with these weapons of defence, have a power of spurring, from their hinder parts, an acid pungent liquor, which, if it lights upon the skin, inflames and burns it like nettles.

The body of an ant is divided, into the head, breast, and belly. In the head the eyes are placed, which are entirely black, and under the eyes, there are two small horns or feelers, composed of twelve joints, all covered with a fine silky hair. The mouth is furnished with two crooked jaws, which project outwards, in each of which are seen incisures, that look like teeth. The breast is covered with a fine silky hair, from which project six legs, that are pretty strong and hairy, the extremities of each armed with two small claws, which the animal uses in

climbing. The belly is more red than the rest of the body, which is of a brown chesnut colour, shining as glass, and covered with extremely fine hair.

From such a formation, this animal seems bolder, and more active, for its size, than any other of the insect tribe, and fears not to attack a creature, often above ten times its own magnitude.

As soon as the winter is past, in the first fine day in April, the ant-hill, that before seemed a desert, now swarms with new life, and myriads of these insects are seen just awaked from their annual lethargy, and preparing for the pleasures and fatigues of the season. For the first day they never offer to leave the hill; which may be considered as their citadel, but run over every part of it, as if to examine its present situation, to observe what injuries it has sustained during the rigours of winter*, while they slept, and to mediate and settle the labours of the day ensuing.

At the first display of their forces, none but the wingless tribe appears, while those furnished with wings remain at the bottom. These are the working ants, that first appear, and that

* *Memoires pour servir a l'Histoire des insectes par Charles de Geer.*

are always destitute of wings; the males and females, that are furnished with four large wings each, are more slow in making their appearance.

Thus, like bees, they are divided into males, females, and the neutral or the working tribe. These are all easily distinguished from each other; the females are much larger than the males; the working ants are the smallest of all. The two former have wings; which, however, they sometimes are divested of; the latter never have any, and upon them are devolved all the labours that tend to the welfare of the community. The female, also, may be distinguished, by the colour and structure of her breast, which is a little more brown, than that of the common ant, and a little brighter than that of the male.

In eight or ten days after their first appearance, the labours of the hill are in some forwardness; the males and females are seen mixed with the working multitude, and pursued or pursuing each other. They seem no way to partake in the common drudgeries of the state; the males pursue the females with great assiduity, and in a manner force them to compliance. They remain coupled for some time, while the males thus united, suffer themselves to be drawn along by the will of their partners.

In the mean time, the working body of the state takes no part in their pleasures, they are seen diligently going from the ant-hill, in pursuit of food for themselves and their associates, and of proper materials for giving a comfortable retreat to their young, or safety to their habitation. In the fields of England, ant-hills are formed with but little apparent regularity. In the more southern provinces of Europe, they are constructed with wonderful contrivance, and offer a sight highly worthy a naturalist's curiosity. These are generally formed in the neighbourhood of some large tree and a stream of water. The one is considered by the animals, as the proper place for getting food; the other for supplying them with moisture, which they cannot well dispense with. The shape of the ant-hill, is that of a sugar loaf, about three feet high, composed of various substances; leaves, bits of wood, sand, earth, bits of gum, and grains of corn. These are all united into a compact body, perforated with galleries down to the bottom, and winding ways within the body of the structure. From this retreat, to the water, as well as to the tree, in different directions, there are many paths worn by constant assiduity, and along these the busy insects are seen passing and re-

passing continually; so that from May, or the beginning of June, according to the state of the season, they work continually, till the bad weather comes on.

The chief employment of the working ants, is in sustaining not only the idlers at home, but also finding a sufficiency of food for themselves. They live upon various provisions, as well of the vegetable as of the animal kind. Small insects they will kill and devour; sweets of all kinds they are particularly fond of. They seldom, however, think of their community, till they themselves are first satiated. Having found a juicy fruit, they swallow what they can, and then tearing it in pieces, carry home their load. If they meet with an insect above their match, several of them will fall upon it at once, and having mangled it, each will carry off a part of the spoil. If they meet, in their excursions, any thing that is too heavy for one to bear, and yet, which they are unable to divide, several of them will endeavour to force it along; some dragging and others pushing. If any one of them happens to make a lucky discovery, it will immediately give advice to others, and then at once, the whole republic will put themselves in motion. If in these struggles, one of them happens to be

killed, some kind survivor will carry him off to a great distance, to prevent the obstructions his body might give to the general spirit of industry.

But while they are thus employed in supporting the state, in feeding abroad, and carrying in provisions to those that continue at home, they are not unmindful of posterity. After a few days of fine weather, the female ants begin to lay their eggs, and those are as assiduously watched and protected by the working ants, who take upon themselves to supply whatever is wanting to the nascent animal's convenience or necessity. They are carried as soon as laid, to the safest situation, at the bottom of their hill, where they are carefully defended from cold and moisture. We are not to suppose, that those white substances which we so plentifully find in every ant-hill, are the eggs as newly laid. On the contrary, the ant's egg is so very small, that, though laid upon a black ground, it can scarcely be discerned. The little white bodies we see, are the young animals in their maggot state, endued with life long since freed from the egg, and often involved in a cone, which it has spun round itself, like the silk worm. The real egg when laid, if viewed through a microscope, appears smooth, polished, and shining, while the mag-

got is seen composed of twelve rings, and is oftner larger than the ant itself.

It is impossible to express the fond attachment which the working ants shew to their rising progeny. In cold weather they take them in their mouths, but without offering them the smallest injury, to the very depths of their habitation, where they are less subject to the severity of the season. In a fine day they remove them, with the same care, nearer the surface, where their maturity may be assisted by the warm beams of the sun. If a formidable enemy should come to batter down their whole habitation, and crush them by thousands in the ruin, yet these wonderful insects, still mindful of their parental duties, make it their first care to save their offspring. They are seen running wildly about, and different ways, each loaded with a young one, often bigger than the insect that supports it. I have kept, says Swammerdam, several of the working ants in my closet, with their young, in a glass filled with earth. I took pleasure in observing, that in proportion as the earth dried on the surface, they dug deeper and deeper to deposite their eggs; and when I poured water thereon, it was surprising to see with what care, affection, and diligence they laboured, to put their brood in safety, in

the driest place. I have seen also, that when water has been wanting for several days, and when the earth was moistened after it a little, they immediately carried their young ones to have a share, who seemed to enjoy and suck the moisture.

When the young maggot is come to its full growth, the breast swells insensibly, it casts its skin, and loses all motion. All the members which were hidden before, then begin to appear, an aurelia is formed, which represents very distinctly, all the parts of the animal, though they are yet without motion, and as it were, wrapped up in swaddling-clothes. When at length, the little insect has passed through all its changes, and acquired its proper maturity, it bursts this last skin, to assume the form it is to retain ever after. Yet this is not done by the efforts of the little animal alone, for the old ones very assiduously break open, with their teeth, the covering in which it is inclosed. Without this assistance the aurelia would never be able to get free, as Mr. De Geer often found, who tried the experiment, by leaving the aurelia to themselves. The old ones not only assist them, but know the very precise time for lending their assistance, for if produced too soon the young one dies of

cold, if retarded too long it is suffocated in its prison.

When the female has done laying, and the whole brood is thus produced, her labours, as well as that of the male, become unnecessary, and her wings, which she had but a short time before so actively employed, drop off. What becomes of her when thus divested of her ornaments is not well known, for she is seen in the cells for some weeks after. The males, on the other hand, having no longer any occupation at home, make use of those wings with which they have been furnished by nature, and fly away, never to return, or to be heard of more. It is probable they perish with the cold, or are devoured by the birds, which are particularly fond of this petty prey.

In the mean time, the working ants having probably depoled their queens, and being deserted by the males, that served but to clog the community, prepare for the severity of the winter, and bury their retreats as deep in the earth as they conveniently can. It is now found that the grains of corn, and other substances with which they furnish their hill, are only meant as fences to keep off the rigours of the weather, not as provisions to support them during its continuance. It is found generally to obtain, that

every insect that lives a year after it is come to its full growth, is obliged to pass four or five months without taking any nourishment, and will seem to be dead all that time. It would be to no purpose therefore for ants to lay up corn for the winter, since they lie that time without motion, heaped upon each other, and are so far from eating, that they are utterly unable to stir. Thus what authors have dignified by the name of a magazine, appears to be no more than a cavity, which serves for a common retreat when the weather forces them to return to their lethargic state.

What has been said with exaggeration of the European ant, is however true, if asserted of those of the tropical climates. They build an ant-hill with great contrivance and regularity, they lay up provisions, and, as they probably live the whole year, they submit themselves to regulations entirely unknown among the ants of Europe.

Those of Africa are of three kinds, the red, the green and the black; the latter are above an inch long, and in every respect a most formidable insect. Their sting produces extreme pain, and their depredations are sometimes extremely destructive. They build an ant-hill of a very great size, from six to twelve feet high;

it is made of viscous clay, and tapers into a pyramidal form. This habitation is constructed with great artifice, and the cells are so numerous and even, that a honey-comb scarce exceeds them in number and regularity.

The inhabitants of this edifice seem to be under a very strict regulation. At the slightest warning they will sally out upon whatever disturbs them, and if they have time to arrest their enemy, he is sure to find no mercy. Sheep, hens, and even rats are often destroyed by these merciless insects, and their flesh devoured to the bone. No anatomist in the world can strip a skeleton so cleanly as they, and no animal, how strong soever, when they have once seized upon it, has power to resist them.

It often happens that these insects quit their retreat in a body, and go in quest of adventures. "During my stay," says Smith, "at Cape Corse Castle, a body of these ants came to pay us a visit in our fortification. It was about day-break when the advanced guard of this famished crew entered the chapel, where some negroe servants were asleep upon the floor. The men were quickly alarmed at the invasion of this unexpected army, and prepared, as well as they could, for a defence. While the foremost battalion of in-

"sects had already taken possession of the place,
"the rear guard was more than a quarter of a
"mile distant. The whole ground seemed
"alive, and crawling with unceasing destruc-
"tion. After deliberating a few moments up-
"on what was to be done, it was resolved to
"lay a large train of gunpowder along the
"path they had taken, by this means millions
"were blown to pieces, and the rear guard per-
"ceiving the destruction of their leaders,
"thought proper instantly to return, and make
"back to their original habitation."

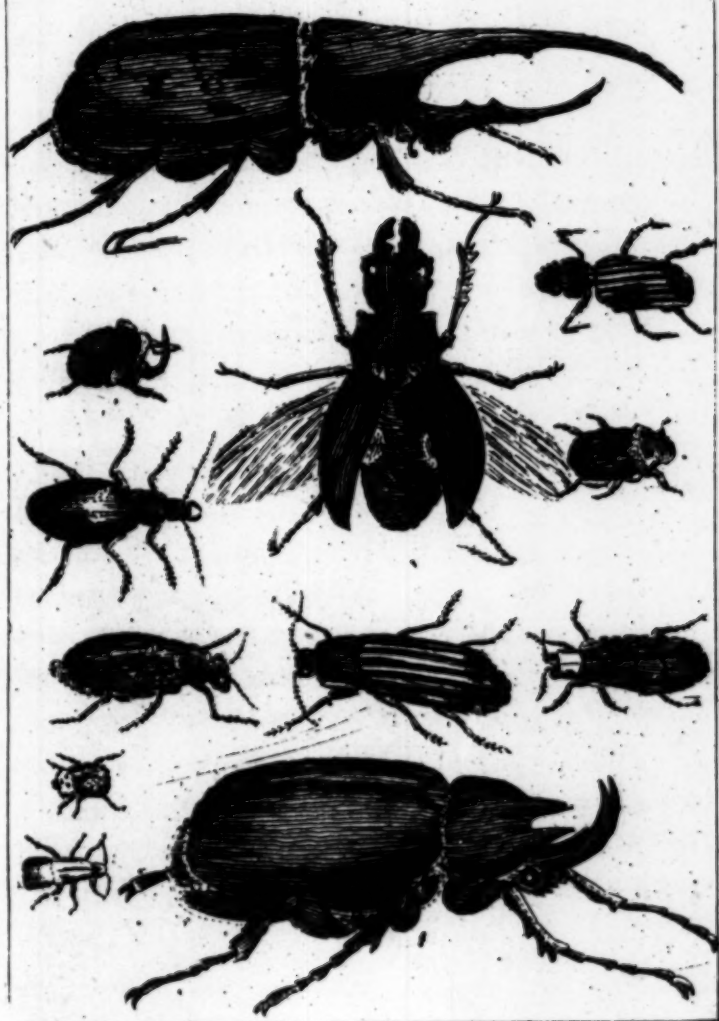
The order which these ants observe, seems
very extraordinary; whenever they sally forth,
fifty or sixty larger than the rest are seen to
head the band, and conduct them to their de-
stined prey. If they have a fixed spot where
their prey continues to resort, they form a
vaulted gallery, which is sometimes a quarter
of a mile in length, and yet, they will hollow
it out in the space of ten or twelve hours.

C H A P. VI.

Of the BEETLE and its VARIETIES.

HITHERTO we have been treating of insects with four transparent wings, we now come to a tribe with two transparent wings, with cases that cover them close while at rest, but which allow them their proper play when flying. The principal of these are the Beetle, the May Bug, and the Cantharis. These are all bred like the rest of their order, first from eggs, then they become grubs, then a chrysalis in which the parts of the future fly are distinctly seen, and lastly the animal leaves its prison, breaking forth as a winged animal in full maturity.

Of the Beetle there are various kinds; all, however, concurring in one common formation of having cases to their wings, which are the more necessary to those insects, as they often live under the surface of the earth, in holes, which they dig out by their own industry. These cases prevent the various injuries their real wings might sustain, by rubbing or crushing against the sides of their abode. These, though



Beetles

et
w
b
a

o
fi
a
fo
a
th
fi
th
fi
b
ti
e

fi
m
m
fi
fi
th
fi
e
th
y

they do not assist flight, yet keep the internal wings clean and even, and produce a loud buzzing noise when the animal rises in the air.

If we examine the formation of all animals, of the beetle kind, we shall find, as in shell-fish, that their bones are placed externally, and their muscles within. These muscles are formed very much like those of quadrupedes, and are endued with such surprising strength, that bulk for bulk, they are a thousand times stronger than those of a man. The strength of these muscles is of use in digging the animal's subterraneous abode, where it is most usually hatched, and to which it most frequently returns, even after it becomes a winged insect, capable of flying.

Beside the difference which results from the shape and colour of these animals, the size also makes a considerable one; some beetles being not larger than the head of a pin; while others, such as the elephant beetle, are as big as one's fist: But the greatest difference among them is, that some are produced in a month, and in a single season go through all the stages of their existence, while others take near four years to their production; and live as winged insects a year more. To give the history of all these

animal's, that are bred pretty much in the same way, would be insipid and endless; it will suffice to select one or two from the number, the origin of which may serve as specimens of the rest. I will, therefore, offer the history of the May-bug to the reader's attention; premising that most other beetles, though not so long lived, are bred in the same manner.

The May-bug, or dorr-beetle, as some call it, has, like all the rest, a pair of cases to its wings, which are of a reddish brown colour, sprinkled with a whitish dust, which easily comes off. In some years their necks are seen covered with a red plate, and in others, with a black; these, however, are distinct sorts, and their difference is by no means accidental. The fore legs are very short, and the better calculated for burrowing in the ground, where this insect makes its retreat. It is well known, for its evening buzz, to children; but still more formidably introduced to the acquaintance of husbandmen and gardeners, for in some seasons, it has been found to swarm in such numbers, as to eat up every vegetable production.

The two sexes in the May-bug, are easily distinguished from each other, by the superior length of the tufts, at the end of the horns, in

the male. They begin to copulate in summer, and at that season, they are seen joined together for a considerable time. The female being impregnated, quickly falls to boring a hole into the ground, where to deposite her burthen. This is generally about half a foot deep, and in it she places her eggs, which are of an oblong shape, with great regularity, one by the other. They are of a bright yellow colour, and no way wrapped up in a common covering, as some have imagined. When the female is lightened of her burden, she again ascends from her hole, to live as before, upon leaves and vegetables, to buzz in the summer evening, and to lie hid, among the branches of trees, in the heat of the day.

In about three months after these eggs have been thus deposited in the earth, the contained insect begins to break its shell, and a small grub or maggot crawls forth, and feeds upon the roots of whatever vegetable it happens to be nearest. All substances, of this kind, seem equally grateful, yet it is probable the mother insect has a choice among what kind of vegetables she shall deposite her young. In this manner these voracious creatures continue in the worm state, for more than three years, devouring the roots of every plant they ap-

proach, and making their way under ground, in quest of food, with great despatch and facility. At length they grow to above the size of a walnut, being a great thick white maggot with a red head, which is seen most frequently in new-turned earth, and which is so eagerly sought after by birds of every species. When largest, they are found an inch and an half long, of a whitish yellow colour, with a body consisting of twelve segments or joints, on each side of which, there are nine breathing holes, and three red feet. The head is large in proportion to the body, of a reddish colour, with a pincer before, and a semi-circular lip, with which it cuts the roots of plants, and sucks out their moisture. As this insect lives entirely under ground, it has no occasion for eyes, and accordingly it is found to have none; but it is furnished with two feelers, which, like the crutch of a blind man, serves to direct its motions. Such is the form of this animal, that lives for years in the worm state under ground, still voracious, and every year changing its skin.

It is not till the end of the fourth year, that this extraordinary insect prepares to emerge from its subterraneous abode, and even this is not effected, but by a tedious preparation.

ABOUT the latter end of autumn, the grub begins to perceive the approaches of its transformation, it then buries itself deeper and deeper in the earth, sometimes six feet beneath the surface, and there forms itself a capacious apartment, the walls of which it renders very smooth and shining, by the excretions of its body. Its abode being thus formed, it begins soon after, to shorten itself, to swell, and to burst its last skin, in order to assume the form of a chrysalis. This, in the beginning appears of a yellowish colour, which heightens by degrees, till at last it is seen nearly red. Its exterior form plainly discovers all the vestiges of the future winged insect, all the fore parts being distinctly seen; while behind, the animal seems as it wrapped in swaddling clothes.

The young May-bug continues in this state for about three months longer, and it is not till the beginning of January, that the aurelia divests itself of all its impediments, and becomes a winged insect, completely formed. Yet still the animal is far from attaining its natural strength, health, and appetite. It undergoes a kind of infant imbecility, and unlike most other insects, that the instant they become flies are arrived at their state of full perfection, the May-bug continues feeble and sickly. Its

colour is much brighter than in the perfect animal, all its parts are soft, and its voracious nature seems for a while, to have entirely forsaken it. As the animal is very often found in this state, it is supposed, by those unacquainted with its real history, that the old ones, of the former season, have buried themselves for the winter, in order to revisit the sun the ensuing summer. But the fact is, the old one never survives the season but dies, like all the other winged tribe of insects, from the severity of cold in winter.

About the latter end of May, these insects, after having lived for four years under ground, burst from the earth, when the first mild evening invites them abroad. They are at that time seen rising from their long imprisonment, from living only upon roots, and imbibing only the moisture of the earth, to visit the mildness of the summer air, to choose the sweetest vegetables for their banquet, and to drink the dew of the evening. Wherever an attentive observer then walks abroad, he will see them bursting up before him in his pathway, like ghosts on a theatre. He will see every part of the earth, that had its surface beaten into hardness, perforated by their egression. When the season is favourable for them, they are seen by myriads

buzzing along, hitting against every object that intercepts their flight. The mid-day sun, however, seems too powerful for their constitutions; they then lurk under the leaves and branches of some shady tree; but the willow seems particularly, their most favourite food; there they lurk in clusters, and seldom quit the tree till they have devoured all its verdure. In those seasons, which are favourable to their propagations, they are seen in an evening as thick as flakes of snow, and hitting against every object with a sort of capricious blindness. Their duration, however, is but short, as they never survive the season. They begin to join shortly after they have been let loose from their prison, and when the female is impregnated, she cautiously bores a hole in the ground, with an instrument fitted for that purpose, which she is furnished with at the tail, and there deposits her eggs, generally to the number of three score. If the season and the soil be adapted to their propagation, these soon multiply as already described, and go through their noxious stages of their contemptible existence. This insect, however, in its worm state, though prejudicial to man, makes one of the chief repasts of the feathered tribe, and is generally the first nourishment with

which they supply their young. Rooks, and hogs are particularly fond of these worms, and devour them in great numbers. The inhabitants of the county of Norfolk, some time since, went into the practice of destroying their rookeries, but in proportion, as they destroyed one plague, they were pestered with a greater; and these insects multiplied in such an amazing abundance, as to destroy not only the verdure of the fields, but even the roots of vegetables, not yet shot forth. One farm in particular was so injured by them in the year 1731, that the occupier was not able to pay his rent, and the landlord was not only content to lose his income for that year, but also gave money for the support of the farmer and his family. In Ireland they suffered so much by these insects, that they came to a resolution of setting fire to a wood, of some miles in extent, to prevent their mischievous propagation.

Of all the beetle kind this is the most numerous, and therefore deserves the chief attention of history. The numerous varieties of other kinds, might repay the curiosity of the diligent observer, but we must be content in general to observe, that in the great out-lines of the history, they resemble those of which we have just been giving a description; like them, all

other beetles are bred from the egg, which is deposited in the ground, or sometimes, though seldom in the barks of trees, they change into a worm; they subsist in that state by living upon the roots of vegetables, or the succulent parts of the bark round them. They generally live a year at least before they change into an aurelia; in that state they are not entirely motionless, nor entirely swaddled up without form.

It would be tedious and endless to give a description of all, and yet it would be an unpardonable omission not to mention the particularities of some beetles, which are singular rather from their size, their manners, or their formation. That beetle which the Americans call the tumble-dung, particularly demands our attention; it is all over of a dusky black, rounder than those animals are generally found to be, and so strong, though not much larger than the common black beetle, that if one of them be put under a brass candlestick, it will cause it to move backwards and forwards, as if it were by an invisible hand, to the admiration of those who are not accustomed to the sight; but this strength is given it for much more useful purposes than those of exciting human curiosity, for there is no creature more laborious, either in seeking subsistence, or in providing a

proper retreat for its young. They are endowed with sagacity to discover subsistence by their excellent smelling, which directs them in flights to excrements just fallen from man or beast, on which they instantly drop, and fall unanimously to work in forming round balls or pellets thereof, in the middle of which they lay an egg. These pellets, in September, they convey three feet deep in the earth, where they lie till the approach of spring, when the eggs are hatched, the nests burst, and the insects find their way out of the earth. They assist each other with indefatigable industry, in rolling these globular pellets to the place where they are to be buried. This they are to perform with the tail foremost, by raising up their hinder part, and shoving along the ball with their hind-feet. They are always accompanied with other beetles of a larger size, and of a more elegant structure and colour. The breast of this is covered with a shield of a crimson colour, and shining like metal; the head is of the like colour, mixed with green, and on the crown of the head stands a shining black horn, bended backwards. These are called the kings of the beetles, but for what reason is uncertain, since they partake of the same dirty drudgery with the rest.

The Elephant-beetle is the largest of this kind hitherto known, and is found in South-America, particularly Guiana and Surinam, as well as about the river Oroonoko. It is of a black colour, and the whole body is covered with a very hard shell, full as thick and as strong as that of a small crab. Its length, from the hinder part to the eyes, is almost four inches, and from the same part to the end of the proboscis, or trunk, four inches and three quarters. The transverse diameter of the body is two inches and a quarter, and the breadth of each elytron, or case for the wings, is an inch and three-tenths. The antennæ or feelers, are quite horny; for which reason the proboscis or trunk is moveable at its insertion into the head, and seems to supply the place of feelers. The horns are eight-tenths of an inch long, and terminate in points. The proboscis is an inch and a quarter long, and turns upwards, making a crooked line, terminating in two horns, each of which is near a quarter of an inch long; but they are not perforated at the end like the proboscis of other insects. About four-tenths of an inch above the head, or that side next the body, is a prominence, or small horn, which if the rest of the trunk were away, would cause this part to resemble the horn of a rhinoceros. There is

indeed a beetle so called, but then the horns or trunk has no fork at the end, though the lower horn resembles this. The feet are all forked at the end, but not like lobster's claws.

To this class we may also refer the glow-worm, that little animal which makes such a distinguished figure in the descriptions of our poets. No two insects can differ more than the male and female of this species from each other. The male is in every respect a beetle, having cases to its wings, and rising in the air at pleasure; the female, on the contrary has none, but is entirely a creeping insect, and is obliged to wait the approaches of her capricious companion. The body of the female has eleven joints, with a shield breast-plate, the shape of which is oval; the head is placed over this, and is very small, and the three last joints of her body are of a yellowish colour; but what distinguishes it from all other animals, at least in this part of the world, is the shining light which it emits by night, and which is supposed by some philosophers, to be an emanation which she sends forth to allure the male to her company. Most travellers who have gone through sandy countries, must well remember the little shining sparks with which the ditches are studded on each side of the road. If incited by

curiosity to approach more nearly, he will find the light sent forth by the glow-worm: if he should keep the little animal for some time, its light continues to grow paler, and at last appears totally extinct: The manner in which this light is produced has hitherto continued inexplicable; it is probable the little animal is supplied with some electrical powers, so that by rubbing the joints of its body against each other, it thus supplies a stream of light which if it allures the male, as we are told, serves for very useful purposes.

The *Cantharis* is of the beetle kind, from whence come cantharides, well known in the shops by the name of Spanish flies, and for their use in blisters. They have feelers like bristles, flexible cases to the wings, a breast pretty plain, and the sides of the belly wrinkled. Cantharides differ from each other in their size, shape, and colour, those used in the shops also do the same. The largest in these parts are about an inch long, and as much in circumference, but others are not above three quarters of an inch. Some are of a pure azure colour, others of pure gold, and others again, have a mixture of pure gold and azure colours; but they are all very brilliant, and extremely beautiful. These insects, as is well

known, are of the greatest benefit to mankind, making a part in many medicines conducive to human preservation. They are chiefly natives of Spain, Italy, and Portugal; but they are to be met with also about Paris in the summer time, upon the leaves of the ash, the poplar, and the rose-trees, and also among wheat, and in meadows. It is very certain, that these insects are fond of ash leaves, insomuch that they will sometimes strip one of these trees quite bare. Some affirm, that these flies delight in sweet-smelling herbs, and it is very certain, that they are fond of honey-suckles, lilach, and wild-cherry shrubs; but some that have sought after them declare, they never could find them on elder-trees, nut-trees, and among wheat. We are told, that the country people expect the return of these insects every seven years. It is very certain, that such a number of these insects have been seen together in the air, that they appeared like swarms of bees; and that they have so disagreeable a smell, that it may be perceived a great way off, especially about sun-set, though they are not seen at that time. This bad smell is a guide for those who make it their business to catch them. When they are caught they dry them, after which they are so light, that fifty will hardly weigh a

dran
bag,
well
vapo
then
The
lyfec
mix
Can
plic
proc
mad
How
of t
urin
ende
in th
no n
man
but
A
ufe
nam
cres
and
nace
and
cove

dram. Those that gather them, tie them in a bag, or a piece of linen cloth, that has been well worn, and then they kill them with the vapours of hot vinegar, after which they dry them in the sun, and keep them in boxes. These flies, thus dried, being chymically analysed, yield a great deal of volatile caustic-salt, mixed with a little oil, phlegm, and earth. Cantharides are penetrating, corrosive, and applied to the skin, raise blisters, from whence proceeds a great deal of serosity. They are made use of both inwardly and outwardly. However it is somewhat strange that the effects of these flies should fall principally upon the urinary passages, for though some authors have endeavoured to account for this, we are still in the dark, for all they have said amounts to no more, than that they affect these parts in a manner which may be very learnedly described, but very obscurely comprehended.

An insect of great, though perhaps not equal use in medicine, is that which is known by the name of the kermes; it is produced in the excrescence of an oak, called the berry-bearing ilex, and appears at first wrapt up in a membranaceous bladder, of the size of a pea, smooth and shining, of a brownish red colour, and covered with a very fine ash-coloured powder.

This bag teems with a number of reddish eggs or insects, which being rubbed with the fingers pour out a crimson liquor. It is only met with in warm countries in the months of May and June. In the month of April this insect becomes of the size and shape of a pea, and its eggs some time after burst from the womb, and soon turning worms, run about the branches and leaves of the tree. They are of two sexes, and the females have been hitherto described; but the males are very distinct from the former, and are a sort of small flies like gnats, with six feet, of which the four forward are short, and the two backward long, divided into four joints, and armed with three crooked nails. There are two feelers on the head, a line and an half long, which are moveable, streaked, and articulated. The tail, at the back part of the body, is half a line long, and forked. The whole body is covered with two transparent wings, and they leap about in the manner of fleas. The harvest of the kermes is greater or less in proportion to the severity of the winter, and the women gather them before sun-rising, tearing them off with their nails; for fear there should be any loss from the hatching of the insects. They sprinkle them with vinegar, and lay them in the sun to dry, where they acquire a red colour.

An insect, perhaps, still more useful than either of the former, is the cochineal, which has been very variously described by authors; some have supposed it a vegetable excrescence from the tree upon which it is found; some have described it as a louse, some as a bug, and some as a beetle. As they appear in our shops when brought from America, they are of an irregular shape, convex on one side, and a little concave on the other; but are both marked with transverse streaks or wrinkles. They are of a scarlet colour within, and without of a blackish red, and sometimes of a white, reddish, or ash-colour, which are accounted the best, and are brought to us from Mexico. The cochineal insect is of an oval form, of the size of a small pea, with six feet, and a snout or trunk. It brings forth its young alive, and is nourished by sucking the juice of the plant. Its body consists of several rings, and when it is once fixed on the plant, it continues immovable, being subject to no change. Some pretend there are two sorts, the one domestic, which is best, and the other wild, that is of a vivid colour; however they appear to be the same, only with this difference, that the wild feeds upon uncultivated trees, without any assistance, whereas the domestic is carefully at a

stated season, removed to cultivated trees, where it feeds upon a purer juice. Those who take care of these insects, place them on the prickly pear-plant in a certain order, and are very industrious in defending them from other insects; for if any other kind come among them, they take care to brush them off with foxes tails. Towards the end of the year, when the rains and cold weather are coming on, which are fatal to these insects, they take off the leaves or branches covered with cochineal, that have not attained their utmost degree of perfection, and keep them in their houses till winter is past. These leaves are very thick and juicy, and supply them with sufficient nourishment, while they remain within doors. When the milder weather returns, and these animals are about to exclude their young, the natives make them nests, like those of birds, but less, of tree-moss, or soft hay, or the down of cocoa-nuts, placing twelve in every nest. These they fix on the thorns of the prickly pear-plant, and in three or four days time they bring forth their young, which leave their nests in a few days, and creep upon the branches of the plant, till they find a proper place to rest in, and take in their nourishment; and until the females are fecundated by the males, which

as in the former tribe, differ very widely, from the females being winged insects, whereas the others only creep, and are at most stationary. When they are impregnated, they produce a new offspring, so that the propagator has a new harvest thrice a year. When the native Americans have gathered the cochineal, they put them into holes in the ground, where they kill them with boiling water, and afterwards dry them in the sun, or in an oven, or lay them upon hot plates. From the various methods of killing them, arise the different colours which they appear in when brought to us. While they are living, they seem to be sprinkled over with a white powder, which they lose as soon as the boiling water is poured upon them. Those that are dried upon hot plates are the blackest. What we call the cochineal are only the females, for the males are a sort of a fly as already observed in the kermes. They are used both for dyeing and medicine, and are said to have much the same virtue as the kermes, though they are now seldom used alone, but are mixed with other things for the sake of the colour.

I shall end this account of the beetle tribe with the history of an animal which cannot properly be ranked under this species, and yet

which cannot be more methodically ranged under any other. This is the insect that forms and resides in the gall-nut, the spoils of which are converted to such useful purposes. The gall insects are bred in a sort of bodies adhering to a kind of oak in Asia, which differ with regard to their colour, size, roughness, smoothness, and shape, and which we call galls. They are not fruit, as some have imagined, but preternatural tumours, owing to the wounds given to the buds, leaves, and twigs of the tree, by a kind of insects that lay their eggs within them. This animal is furnished with an implement, by which the female penetrates into the bark of the tree, or into that spot which just begins to bud, and there sheds a drop of corrosive fluid into the cavity. Having thus formed a receptacle for her eggs, she deposits them in the place, and dies soon after. The heart of the bud being thus wounded, the circulation of the nutritive juice is interrupted and the fermentation thereof, with poison injected by the fly, burns the parts adjacent, and then alters the natural colour of the plant. The juice or sap turned back from its natural course, extravasates and flows round the egg. After which it swells and dilates by the assistance of some bubbles of air, which get admission through the

pores of the bark, and which run in the vessels with the sap. The external coat of this excrecence is dried by the air, and grows into a figure which bears some resemblance to the bow of an arch, or the roundness of a kernel. This little ball receives its nutriment, growth, and vegetation as the other parts of the tree by slow degrees, and is what we call the *gall-nut*. The worm that is hatched under this spacious vault, finds in the substance of the ball, which is as yet very tender, a subsistence suitable to its nature; gnaws and digests it till the time comes for its transformation to a nymph, and from that state of existence changes into a fly. After this the insect, perceiving itself duly provided with all things requisite, disengages itself soon from its confinement, and takes its flight into the open air. The case however, is not similar with respect to the gall-nut, that grows in autumn. The cold weather frequently comes on before the worm is transformed into a fly, or before the fly can pierce through its inclosure. The nut falls with the leaves; and although you may imagine that the fly which lies within is lost, yet in reality it is not so; on the contrary, its being covered up so close, is the means of its preservation. Thus it spends the winter in a warm house, where every crack and cranny

of the nut is well stopped up ; and lies buried as it were under a heap of leaves, which preserves it from the injuries of the weather. This apartment, however, though so commodious a retreat in the winter, is a perfect prison in the spring. The fly, roused out of its lethargy by the first heats, breaks its way through, and ranges where it pleases. A very small aperture is sufficient since at this time the fly is but a diminutive creature. Besides, the ringlets whereof its body is composed, dilate, and become pliant in the passage.

CHAP. VII.

Of the GNAT and TIPULA.

THERE are two insects which entirely resemble each other in their form, and yet widely differ in their habits, manners, and propagation. Those who have seen the tipula, or long-legs, and the larger kind of gnat, have most probably mistaken the one for the other, they have often accused the tipula, a harmless insect, of depredations made by the gnat, and the innocent have suffered for the guilty; indeed the differences in their form are so very minute, that it often requires the assistance of a microscope to distinguish the one from the other: they are both mounted on long-legs, both furnished with two wings and a slender body; their heads are large, and they seem to be hump-backed; the chief and only difference, therefore, is, that the tipula wants a trunk, while the gnat has a large one, which it often exerts to very mischievous purposes. The tipula is a harmless peaceful insect, that offers injury to nothing; the gnat is sanguinary and

predaceous, ever seeking out for a place in which to bury its trunk, and pumping up the blood from the animal in large quantities.

The gnat proceeds from a little worm, which is usually seen at the bottom of standing waters. The manner in which the insect lays its eggs is particularly curious; after having laid the proper number on the surface of the water, it surrounds them with a kind of unctuous matter, which prevents them from sinking; but at the same time fastens them with a thread to the bottom, to prevent their floating away, at the mercy of every breeze, from a place the warmth of which is proper for their production, to any other, where the water may be too cold, or the animals its enemies too numerous. Thus the insects, in their egg state, resemble a buoy, which is fixed by an anchor. As they come to maturity they sink deeper, and at last, when they leave the egg as worms they creep at the bottom. They now make themselves lodgements of cement, which they fasten to some solid body at the very bottom of the water, unless, by accident, they meet with a piece of chalk, which being of a soft and pliant nature, gives them an opportunity of sinking a retreat for themselves, where nothing but the claws of a cray-fish can possibly molest them. The worm

after
large
moist
make
the a
port
the c
to gr
an u
her
tran
ing
water
perly
is an
In t
conc
ante
feem
the
cuts
last
just
ado
bod
it fi
the
eith

afterwards changes its form. It appears with a large head, and a tail invested with hair, and moistened with an oleaginous liquor, which she makes use of as a cork, to sustain her head in the air, and her tail in the water, and to transport her from one place to another. When the oil with which her tail is moistened begins to grow dry, she discharges out of her mouth an unctuous humour, which she sheds all over her tail, by virtue whereof, she is enabled to transport herself where she pleases, without being either wet or any ways incommoded by the water. The gnat, in her second state, is properly speaking, in her form of a nymph, which is an introduction, or entrance into a new life. In the first place, she divests herself of her second skin; in the next she resigns her eyes, her antennæ, and her tail; in short, she actually seems to expire. However, from the spoils of the amphibious animal, a little winged insect cuts the air, whose every part is active to the last degree, and whose whole structure is the just object of our admiration. Its little head is adorned with a plume of feathers, and its whole body invested with scales and hair, to secure it from any wet or dust. She makes trial of the activity of her wings, by rubbing them either against her body, or her broad side-bags,

which keep her in an equilibrium. The fur-
below, or little border of fine feathers, which
graces her wings is very curious, and strikes
the eye in the most agreeable manner. There
is nothing, however, of greater importance to
the gnat, than her trunk, and that weak im-
plement may justly be deemed one of Nature's
master-pieces. It is so very small, that the ex-
tremity of it can scarcely be discerned through
the best microscope that can be procured.
That part which is at first obvious to the eye,
is nothing but a long scaly sheath under the
throat. At near the distance of two-thirds of
it, there is an aperture, through which the in-
sect darts out four stings, and afterwards re-
tracts them. One of which, however sharp and
active it may be, is no more than the case in
which the other three lie concealed, and run
in a long groove. The sides of these stings
are sharpened like two-edged swords; they
are likewise barbed, and have a vast number
of cutting teeth towards the point, which turns
up like a hook, and is fine beyond expression.
When all these darts are stuck into the flesh
of animals, sometimes one after another, and
sometimes all at once, the blood and humours
of the adjacent parts must unavoidably be ex-
travasated; upon which a tumour must conse-

quent
up b
Whe
she m
fruit,
if it b
ing h
least
erts
possib
her sh
to the
reed,
is the
her v
she h
she c
season
she a
flies
ford,
her p
way
runn
times
ged
green
if the

quently ensue, the little orifice whereof is closed up by the compression of the external air. When the gnat, by the point of her case, which she makes use of as a tongue, has tasted any fruit, flesh, or juice, that she has found out; if it be a fluid, she sucks it up, without playing her darts into it; but in case she finds the least obstruction by any flesh whatever, she exerts her strength, and pierces through it, if possibly she can. After this she draws back her stings into their sheath, which she applies to the wound in order to extract, as through a reed, the juices which she finds inclosed. This is the implement with which the gnat performs her work in the summer, for during the winter she has no manner of occasion for it. Then she ceases to eat, and spends all that tedious season either in quarries or in caverns, which she abandons at the return of summer, and flies about in search after some commodious ford, or standing water, where she may produce her progeny, which would be soon washed away and lost, by the too rapid motion of any running stream. The little brood are sometimes so numerous, that the very water is tinged according to the colour of the species, as green, if they be green, and of a sanguine hue, if they be red.

These are circumstances sufficiently extraordinary in the life of this little animal, but it offers something still more curious in the method of its propagation. However similar insects of the gnat kind are in their appearance, yet they differ widely from each other in the manner in which they are brought forth, for some are oviparous, and are produced from eggs, some are viviparous, and come forth in their most perfect form; some are males, and unite with the female; some are females, requiring the impregnation, of the male; some are of neither sex, yet still produce young, without any copulation whatsoever. This is one of the strangest discoveries in all Natural History! A gnat separated from the rest of its kind, and inclosed in a glass vessel, with air sufficient to keep it alive, shall produce young, which also, when separated from each other, shall be the parents of a numerous progeny. Thus, down for five or six generations do these extraordinary animals propagate without the use of copulation, without any congress between the male and female, but in the manner of vegetables, the young bursting from the body of their parents, without any previous impregnation. At the sixth generation however, their propagation stops, the gnat no longer produces its like, from itself

alone
give
T
nels;
beds
of fle
is ver
Ame
clima
in m
air is
infect
fix in
quire
tion
is too
theev
shiel
tacks
more
The
with
used
inco
rived
tages
gnat
seems

alone, but it requires the access of the male to give it another succession of fecundity.

The gnat of Europe gives but little uneasiness; it is sometimes heard to hum about our beds at night, and keeps off the approaches of sleep by the apprehension it causes; but it is very different in the ill-peopled regions of America, where the waters stagnate, and the climate is warm, and where they are produced in multitudes beyond expression. The whole air is there filled with clouds of those famished insects and they are found of all sizes, from six inches long, to a minuteness that even requires the microscope to have a distinct perception of them. The warmth of the midday-sun is too powerful for their constitutions; but when the evening approaches, neither art nor flight can shield the wretched inhabitants from their attacks, tho' millions are destroyed, still millions more succeed, and produce unceasing torment. The native Indians, who anoint their bodies with oil, and who have from their infancy been used to their depredations, find them much less inconvenient than those who are newly arrived from Europe; they sleep in their cottages covered all over with thousands of the gnat kind upon their bodies, and yet do not seem to have their slumbers interrupted by

their cruel devourers. If a candle happens to be lighted in one of those places, a cloud of insects at once light upon the flame, and extinguish it; they are therefore obliged to keep their candles in glass lanthorns; a miserable expedient to prevent an unceasing calamity.

PART V.

A N

HISTORY

OF THE

ZOOPHYTES.

V
ch
fo
the
at
ran
the
the
en
im
life
ma
pla
the
of
S
the
life
tho
wo
imp
of
fon
V

C H A P. I.

Of ZOOPHYTES in General.

WE are now come to the last link in the chain of Animated Nature, to a class of beings so confined in their powers, and so defective in their formation, that some historians have been at a loss whether to consider them as a superior rank of vegetables, or the humblest order of the animated tribe. In order therefore to give them a denomination, agreeable to their existence, they have been called Zoophytes, a name implying vegetable nature indued with animal life; and indeed, in some the marks of the animal are so few, that it is difficult to give their place in Nature with precision, or to tell whether it is a plant or an insect that is the object of our consideration.

Should it be asked what it is that constitutes the difference between animal and vegetable life, what it is that lays the line that separates those two great kingdoms from each other, it would be difficult, perhaps we should find it impossible, to return an answer. The power of motion cannot form this distinction, since some vegetables are possessed of motion, and

many animals are totally without it. The sensitive plant has obviously a greater variety of motions than the oyster or the pholas. The animal that fills the acorn-shell is immoveable, and can only close its lid to defend itself from external injury, while the flower, which goes by the name of the fly-trap, seems to close upon the flies that light upon it and that attempt to rifle it of its honey. The animal in this instance, seems to have scarce a power of self defence; the vegetable not only guards its possessions, but seizes upon the robber that would venture to invade them. In like manner, the methods of propagation give no superiority to the lower rank of animals. On the contrary, vegetables are frequently produced more conformably to the higher ranks of the creation, and though some plants are produced by cuttings from others, yet the general manner of propagation is from seeds, laid in the womb of the earth, where they are hatched into the similitude of the parent plant or flower. But a most numerous tribe of animals have lately been discovered, which are propagated by cuttings, and this in so extraordinary a manner, that, though the original insect be divided into a thousand parts, each, however small, shall be formed into an animal, entirely resembling that which was at first divided; in this respect,

therefore, certain races of animals seem to fall beneath vegetables, by their more imperfect propagation.

What, therefore, is the distinction between them—or are the orders so intimately blended as that it is impossible to mark the boundaries of each? To me it would seem, that all animals are possessed of one power, of which vegetables are totally deficient; I mean either the actual ability, or an awkward attempt at self-preservation. However vegetables may seem possessed of this important quality, yet it is with them but a mechanical impulse, resembling the raising one end of the lever, when you depress the other; the sensitive plant contracts and hangs its leaves indeed, when touched, but this motion no way contributes to its safety; the fly-trap flower acts entirely in the same manner; and though it seems to seize the little animal, that comes to annoy it, yet, in reality, only closes mechanically upon it, and this inclosure neither contributes to its preservation nor its defence. But it is very different with insects, even of the lowest order; the earth-worm not only contracts, but hides itself in the earth, and escapes with some share of swiftness from its pursuers. The polypus hides its horns; the star-fish contracts its arms, upon the ap-

pearance even of distant dangers; they not only hunt for their food, but provide for their safety, and however imperfectly they may be formed, yet still they are in reality, placed many degrees above the highest vegetable of the earth, and are possessed of many animal functions, as well as those that are more elaborately formed.

But though these be superior to plants, they are very far beneath their animated fellows of existence. In the class of zoophytes, we may place all those animals, which may be propagated by cuttings, or in other words which, if divided into two or more parts, each part in time, becomes a separate and perfect animal; the head shoots forth a tail, and on the contrary, the tail produces a head; some of these will bear dividing but into two parts, such is the earth-worm; some may be divided into more than two, and of this kind are many of the star-fish; others still may be cut into a thousand parts, each becoming a perfect animal; they may be turned inside out, like the finger of a glove, they may be moulded into all manner of shapes, yet still their vivacious principle remains, still every single part becomes perfect in its kind, and after a few days existence, exhibits all the arts and in-

dustry of its contemptible parent! We shall, therefore, divide zoophytes according to their several degrees of perfection, namely, into worms, star-fish, and polypi; contenting ourselves with a short review of those nauseous and despicable creatures, that excite our curiosity chiefly by their imperfections; it must not be concealed, however, that much has of late been written on this part of natural history. A new mode of animal production, could not fail of exciting not only the curiosity, but the astonishment of every philosopher; many found their favourite systems totally overthrown by the discovery, and it was not without a wordy struggle, that they gave up what had formerly been their pleasure and their pride. At last, however, conviction became too strong for argument, and a question, which owed its general spread rather to its novelty, than to its importance, was given up in favour of the new discovery.

C H A P. II.

Of WORMS.

THE first in the class of zoophytes, are animals of the worm kind, which being entirely destitute of feet, trail themselves along upon the ground, and find themselves a retreat under the earth, or in the water. As these, like serpents, having a creeping motion, so both, in general, go under the common appellation of reptiles; a loathsome, noxious, malignant tribe, to which man by nature, as well as by religion, has the strongest antipathy. But though worms, as well as serpents, are mostly without feet, and have been doomed to creep along the earth on their bellies, yet their motions are very different. The serpent, as has been said before, having a back bone, which it is incapable of contracting, bends its body into the form of a bow, and then shoots forward from the tail; but it is very different with the worm, which has a power of contracting or lengthening itself at will. There is a spiral muscle, that runs round its whole body, from the head to the tail, somewhat resembling a wire wound round a

walking-cane, which, when slipped off, and one end extended and held fast, will bring the other nearer to; in this manner the earth-worm, having shot out, or extended its body, takes hold by the slime of the fore part of its body, and so contracts and brings forward the hinder part; in this manner it moves onward, not without great effort, but the occasions for its progressive motion are few.

As it is designed for living under the earth, and leading a life of obscurity, so it seems tolerably adapted to its situation. Its body is armed with small stiff sharp burrs or prickles, which it can erect or depress at pleasure; under the skin there lies a slimy juice, to be ejected as occasion requires, at certain perforations, between the rings of the muscles, to lubricate its body, and facilitate its passage into the earth. Like most other insects, it hath breathing-holes along the back, adjoining each ring; but it is without bones, without eyes, without ears, and, properly, without feet. It has a mouth, and also an alimentary canal, which runs along to the very point of the tail. In some worms, however, particularly such as are found in the bodies of animals, this canal opens towards the middle of the belly, at some distance from the tail. The intestines of the earth-worm, are al-

ways found filled with a very fine earth, which seems to be the only nourishment these animals are capable of receiving.

The animal is entirely without brain, but near the head is placed the heart, which is seen to beat with a very distinct motion, and round it are the spermatic vessels, forming a number of little globules, containing a milky fluid, which have an opening into the belly, not far from the head: they are also often found to contain a number of eggs, which are laid in the earth, and are hatched in twelve or fourteen days into life, by the genial warmth of their situation; like snails, all these animals unite in themselves, both sexes at once; the reptile that impregnates, being impregnated in turn: few that walk out, but must have observed them, with their heads laid against each other, and so strongly attached, that they suffer themselves to be trod upon.

When the eggs are laid in the earth, which, in about fourteen days, as has been said, are hatched into maturity, the young ones come forth very small, but perfectly formed, and suffer no change during their existence: how long their life continues is not well known, but it certainly holds for more than two or three seasons. During the winter, they bury them-

selves deeper in the earth, and seem, in some measure, to share the general torpidity of the insect tribe. In spring, they revive with the rest of Nature, and on those occasions, a moist or dewy evening brings them forth from their retreats, for the universal purpose of continuing their kind. They chiefly live in a light, rich, and fertile soil, moistened by dews or accidental showers, but avoid those places where the water is apt to lie on the surface of the earth, or where the clay is too stiff for their easy progression under ground.

Helpless as they are formed, yet they seem very vigilant in avoiding those animals that chiefly make them their prey; in particular, the mole, who feeds entirely upon them beneath the surface, and who seldom ventures, from the dimness of its sight, into the open air; him they avoid, by darting up from the earth, the instant they feel the ground move; and fishermen, who are well acquainted with this, take them in what numbers they chuse, by stirring the earth where they expect to find them. They are also driven from their retreats under ground, by pouring bitter or acrid water thereon, such as that water in which green walnuts have been steeped, or a lye made of pot-ashes.

Such is the general outline of the history of these reptiles, which, as it should seem, degrades them no way beneath the rank of other animals of the insect creation; but we now come to a part of their history, which proves the imperfection of their organs, from the easiness with which these little machines may be damaged and repaired again. It is well known in mechanics, that the finest and most complicated instruments are the most easily put out of order, and the most difficultly set right; the same also obtains in the animal machine. Man, the most complicated machine of all others, whose nerves are more numerous, and powers of action more various, is most easily destroyed: he is seen to die under wounds which a quadrupede or a bird could easily survive; and as we descend gradually to the lower ranks, the ruder the composition, the more difficult it is to disarrange it. Some animals live without their limbs, and often are seen to reproduce them; some are seen to live without their brain for many weeks together; caterpillars continue to increase and grow large, though all their nobler organs are entirely destroyed within; some animals continue to exist, though cut in two, their nobler parts preserving life, while the others perish that were cut away; but the earth worm, and

all the zoophyte tribe, continue to live in separate parts, and one animal, by the means of cutting, is divided into two distinct existences, sometimes into a thousand!

There is no phænomenon in all Natural History more astonishing than this, that man, at pleasure, should have a kind of creative power, and out of one life make two, each completely formed, with all its apparatus and functions, each with its perceptions, and powers of motion and self-preservation, each as complete in all respects as that from which it derived its existence, and equally enjoying the humble gratifications of its nature.

When Des Cartes first started the opinion, that brutes were machines, the discovery of this surprising propagation was unknown, which might, in some measure, have strengthened his fanciful theory. What is life, in brutes, he might have said, or where does it reside? In some we find it so diffused, that every part seems to maintain a vivacious principle, and the same animal appears possessed of a thousand distinct irrational souls at the same time. But let us not, he would say, give so noble a name to such contemptible powers, but rank the vivifying principle in these with the sap that rises in vegetables, or the moisture that con-

tracts a cord, or the heat that puts water into motion ! Nothing, in fact, deserves the name of soul, but that which reasons, that which understands, and by knowing God, receives the mark of its currency, and is minted with the impresson of its great Creator !

Such might have been the speculations of this philosopher. However to leave theory, it will be sufficient to say that we owe the first discovery of this power of reproduction in animals to Mr. Trembley, who first observed it in the polypus, and after him, Spalanzani and others found it taking place in the earth-worm, the sea-worm, and several other ill-formed animals of a like kind, which were susceptible of this new mode of propagation. This last philosopher, has tried several experiments upon the earth-worm, many of which succeeded according to his expectation ; every earth-worm, however, did not retain the vivacious principle with the same obstinacy ; some, when cut in two, were entirely destroyed ; others survived only in the nobler part ; and while the head was living the tail entirely perished, and a new one was seen to burgeon from the extremity. But what was most surprizing of all, in some, particularly in the small red-headed earth-worm, both extremities survived the operation ; the head produced

a tail with the anus, the intestines, the annular muscles, and the prickly beards; the tail part, on the other hand, was seen to shoot forth the nobler organs, and in less than the space of three months sent forth a head, heart, with all the apparatus and instruments of generation. This part, as may be easily supposed, was produced much more slowly than the former, a new head taking above three or four months for its completion, a new tail being shot forth in less than as many weeks. Thus two animals, by dissection, were made out of one, each with their separate appetites, each endued with life and motion, and seemingly as perfect as that single animal from whence they derived their origin.

What was performed upon the earth-worm, was found to obtain also in many other of the vermicular species. The sea-worm, the white water-worm, and many of those little worms with feelers, found at the bottom of dirty ditches; in all these the nobler organs are of such little use, that if taken away, the animal does not seem to feel the want of them; it lives in all its parts, and in every part, and by a strange paradox in Nature, the most useless and contemptible life is of all others the most difficult to destroy.

C H A P. III.

Of the STAR-FISH.

THE next order of zoophytes is that of the star-fish, a numerous tribe, shapeless and deformed, assuming at different times different appearances. The same animal that now appears round like a ball, shortly after flattens as thin as a plate. All of this kind are formed of a semi-transparent gelatinous substance, covered with a thin membrane, and, to an inattentive spectator, often appear like a lump of inanimate jelly, floating at random upon the surface of the sea, or thrown by chance on shore at the departure of the tide. But upon a more minute inspection, they will be found possessed of life and motion; they will be found to shoot forth their arms in every direction, in order to seize upon such insects as are near, and to devour them with great rapacity. Worms, the spawn of fish, and even muscles themselves, with their hard resisting shell, have been found in the stomachs of these voracious animals; and what is very extraordinary, though the substance of their own bodies be almost as soft as water, yet they are no way injured by swallow-

he
e-
p-
rs
in
a
ed
ve
i-
ce
at
re
ed
or
to
e-
ne
s,
d
d
o-
as
y-



THE
THE
THE



1 The Cuttle Fish
2 The Sea Star
3 The Sea Nettle

ing these shells, which are almost of a stony hardness. They increase in size as all other animals do. In summer, when the water of the sea is warmed by the heat of the sun, they float upon the surface, and in the dark they send forth a kind of shining light resembling that of phosphorus. Some have given these animals the name of sea-nettles, because they burn the hands of those that touch them, as nettles are found to do. They are often seen fastened to the rocks, and to the largest sea-shells, as if to derive their nourishment from them. If they be taken and put into spirit of wine, they will continue for many years entire, but if they be left to the influence of the air, they are in less than four and twenty hours melted down into limpid and offensive water.

In all of this species, none are found to possess a vent for their excrements, but the same passage by which they devour their food, serves for the ejection of their fæces. These animals as was said, take such a variety of figures, that it is impossible to describe them under one determinate shape; but in general, their bodies resemble a truncated cone, whose base is applied to the rock to which they are found usually attached. Tho' generally transparent, yet they are found of different colours, some inclining to

green, some to red, some to white, and some to brown. In some, their colours appear diffused over the whole surface, in some, they are often streaked, and in others often spotted. They are possess of a very slow progressive motion, and in fine weather, they are continually seen, stretching out and fishing for their prey. Many of them are possess of a number of long slender filaments, in which they entangle any small animals they happen to approach, and thus draw them into their enormous stomachs, which fill the whole cavity of their bodies. The harder shells continue for some weeks indigested, but at length, they undergo a kind of maceration in the stomach, and become a part of the substance of the animal itself. The indigestible parts, are returned by the same aperture by which they were swallowed, and then the star fish begins to fish for more. These also may be cut in pieces, and every part will survive the operation; each becoming a perfect animal, endued with its natural rapacity. Of this tribe, the number is various, and the description of each would be tedious and uninteresting; the manners and nature of all, are nearly as described; but I will just make mention of one creature, which, though not properly belonging to this class,

yet is so nearly related, that the passing it in silence would be an unpardonable omission.

Of all other animals, the cuttle-fish, tho' in some respect superior to this tribe, possesses qualities the most extraordinary. It is about two feet long, covered with a very thin skin, and its flesh composed of a gelatinous substance, which however within-side is strengthened by a strong bone, of which such great use is made by the goldsmiths. It is possessed of eight arms, which it extends, and which are probably of service to it in fishing for its prey; while in life, it is capable of lengthening or contracting these at pleasure; but when dead they contract and lose their rigidity. They feed upon small fish, which they seize with their arms; and they are bred from eggs, which are laid upon the weeds along the sea-shore.

The cuttle-fish is found along many of the coasts of Europe, but are not easily caught, from a contrivance with which they are furnished by Nature; this is a black substance, of the colour of ink, which is contained in a bladder generally on the left-side of the belly, and which is ejected in the manner of an excrement from the anus. Whenever therefore this fish is pursued, and when it finds a difficulty of escaping, it spurts forth a great quantity of this black

liquor, by which the waters are totally darkened, and then it escapes, by lying close at the bottom. In this manner the creature finds its safety, and men find ample cause for admiration, from the great variety of stratagems with which creatures are endued for their peculiar preservation,

CHAP. IV.

Of the POLYPUS.

THOSE animals which we have described in the last chapter, are variously denominated. They have been called the Star-fish, Sea-nettles, and Sea-polypi. This last name has been peculiarly ascribed to them by the ancients, because of the number of feelers or feet of which they are all possest, and with which they have a slow progressive motion; but the moderns have given the name of Polypus, to a reptile that lives in fresh water, by no means so large or observable. These are found at the bottom of wet ditches, or attached to the under surface of the broad-leaved plants that grow and swim on the waters. The same difference holds between these and the sea-water polypus, as between all the productions of the sea, and of the land and the ocean. The marine vegetables and animals grow to a monstrous size. The eel, the pike, or the bream of fresh-waters, is but small; but in the sea they grow to an enormous magnitude. The herbs of the field are at most but a few feet high; those of the sea often shoot forth a stalk of an hundred. It

is so between the polypi of both elements. Those of the sea are found from two feet in length to three or four, and Pliny has even described one, the arms of which were no less than thirty feet long. Those in fresh waters, however, are comparatively minute, at their utmost size, seldom above three parts of an inch long, and when gathered up into their usual form, not above a third even of those dimensions.

It was upon these minute animals, that the power of dissection was first tried in multiplying their numbers. They had been long considered as little worthy the attention of observers, and were consigned to that neglect in which thousands of minute species of insects remain to this very day. It is true, indeed, that Reaumur observed, classed, and named them. By contemplating their motions, he was enabled distinctly to pronounce on their being of the animal, and not of the vegetable kingdom; and he called them Polypi, from their great resemblance to those larger ones that were found in the ocean. Still, however, their properties were neglected, and their history unknown.

Mr. Trembley was the person to whom we owe the first discovery of the amazing properties and powers of this little vivacious creature: He divided this class of animals into four different

kinds; into those inclining to green, those of a brownish cast, those of flesh-colour, those which he calls the *polype de panache*. The differences of structure in these, as also of colour, are observable enough; but the manner of their subsisting, of seizing their prey, and of their propagation, is pretty nearly the same in all.

Whoever has looked with care into the bottom of a wet ditch, when the water is stagnant, and the sun has been powerful, may remember to have seen many little transparent lumps of jelly, about the size of a pea, and flattened on one side; such also as have examined the under side of the broad-leaved weeds that grow on the surface of the water, must have observed them studded with a number of these little jelly-like substances, which were probably then disregarded, because their nature and history was unknown. These little substances, however, were no other than living polypi gathered up into a quiescent state and seemingly inanimate, because either disturbed, or not excited by the calls of appetite to action. When they are seen exerting themselves they put on a very different appearance from that when at rest; to conceive a just idea of their figure, we may suppose the finger of a glove cut off at the bottom; we may

suppose also several threads or horns planted round the edge like a fringe. The hollow of this finger will give us an idea of the stomach of the animal, the threads issuing forth from the edges may be considered as the arms or feelers, with which it hunts for its prey. The animal, at its greatest extent, is seldom seen above an inch and a half long, but it is much shorter when it is contracted and at rest; it is furnished neither with muscles nor rings, and its manner of lengthening or contracting itself, more resembles that of the snail, than worms, or any other insect. The polypus contracts itself more or less, in proportion as it is touched, or as the water is agitated in which they are seen. Warmth animates them, and cold benumbs them; but it requires a degree of cold approaching congelation before they are reduced to perfect inactivity; those of an inch have generally their arms double, often thrice as long as their bodies. The arms, where the animal is not disturbed, and the season not unfavourable, are thrown about in various directions, in order to seize and entangle its little prey; sometimes three or four of the arms are thus employed, while the rest are contracted like the horns of a snail, within the animal's body. It seems capable of giving what length it pleases to these arms; it con-

tracts and extends them at pleasure, and stretches them only in proportion to the remoteness of the object it would seize.

These animals have a progressive motion, which is performed by that power they have of lengthening and contracting themselves at pleasure; they go from one part of the bottom to another; they mount along the margin of the water, and climb up the side of aquatic plants. They are often seen to come to the surface of the water, where they suspend themselves by their lower end. As they advance but very slowly, they employ a great deal of time in every action, and bind themselves very strongly to whatever body they chance to move upon as they proceed; their adhesion is voluntary, and is probably performed in the manner of a cupping-glass applied to the body.

All animals of this kind have a remarkable attachment to turn towards the light, and this naturally might induce an inquirer to look for their eyes; but however carefully this search has been pursued, and however excellent the microscope with which every part was examined, yet nothing of the appearance of this organ was found over the whole body; and it is most probable that, like several other insects which hunt their prey by their feeling, these creatures

are unfurnished with advantages which would be totally useless for their support.

In the centre of the arms, as we said before, the mouth is placed, which the animal can open and shut at pleasure, and this serves at once as a passage for food, and an opening for it after digestion. The inward part of the animal's body seems to be one great stomach, which is open at both ends; but the purposes which the opening at the bottom serves are hitherto unknown, but certainly not for excluding their excrements, for those are ejected at the aperture by which they are taken in. If the surface of the body of this little creature be examined with a microscope, it will be found studded with a number of warts, as also the arms, especially when they are contracted; and these tubercles, as we shall presently see, answer a very important purpose.

If we examine their way of living, we shall find these insects chiefly subsisting upon others, much less than themselves, particularly a kind of millepedes that live in the water, and a very small red worm, which they seize with great avidity. In short, no insect whatsoever, less than themselves, seems to come amiss to them; their arms, as was observed before, serve them as a net would a fisherman, or perhaps more

exactly speaking, as a lime-twig does a fowler. Wherever their prey is perceived, which the animal effects by its feeling, it is sufficient to touch the object it would seize upon and it is fastened, without a power of escaping. The instant one of this insect's long arms is laid upon a millepede, the little insect sticks without a possibility of retreating. The greater the distance at which it is touched, the greater is the ease with which the polypus brings the prey to its mouth. If the little object be near, tho' irretrievably caught, it is not without great difficulty that it can be brought to the mouth and swallowed. When the polypus is unsupplied with prey, it testifies its hunger by opening its mouth; the aperture, however, is so small that it cannot be easily perceived; but when, with any of its long arms, it has seized upon its prey, it then opens the mouth distinctly enough, and this opening is always in proportion to the size of the animal which it would swallow; the lips dilate insensibly by small degrees, and adjust themselves precisely to the figure of their prey. Mr. Trembley, who took a pleasure in feeding this useless brood, found that they could devour aliments of every kind, fish and flesh, as well as insects; but he owns they did not thrive so well upon beef and veal, as upon the little worms of their own

providing. When he gave one of these famished reptiles any substance which was improper to serve for aliment, at first it seized the prey with avidity, but after keeping it some time entangled near the mouth, dropt it again with distinguishing nicety.

When several polypi happen to fall upon the same worm, they dispute their common prey with each other. Two of them are often seen seizing the same worm at different ends, and dragging it at opposite directions with great force. It often happens, that while one is swallowing its respective end, the other is also employed in the same manner, and thus they continue swallowing each his part, until their mouths meet together; they then rest, each for some time in this situation, till the worm breaks between them, and each goes off with his share; but it often happens, that a seemingly more dangerous combat ensues, when the mouths of both are thus joined upon one common prey together: the largest polypus then gapes and swallows his antagonist; but what is very wonderful, the animal thus swallowed seems to be rather a gainer by the misfortune. After it has lain in the conqueror's body for about an hour, it issues unhurt, and often in possession of the prey which had been the ori-

ginal
it be
each
Th
year,
cong
the i
of N
three
one t
and l
are to
fices
neral
propo
quick
best f
they
same
Suc
little
main
rather
the af
They
ners a
are pr
their

ginal cause of contention ; how happy would it be for men, if they had as little to fear from each other !

These reptiles continue eating the whole year, except when the cold approaches to congelation ; and then, like most others of the insect tribe, they feel the general torpor of Nature, and all their faculties are for two or three months suspended ; but if they abstain at one time, they are equally voracious at another, and like snakes, ants, and other animals that are torpid in winter, the meal of one day suffices them for several months together. In general, however, they devour more largely in proportion to their size, and their growth is quick exactly as they are fed ; such as are the best supplied, soonest acquire the largest size, but they diminish also in their growth with the same facility, if their food be taken away.

Such are the more obvious properties of these little animals, but the most wonderful still remain behind : Their manner of propagation, or rather multiplication, has for some years been the astonishment of all the learned of Europe. They are produced in as great a variety of manners as every species of vegetable. Some polypi are propagated from eggs, as plants are from their seed ; some are produced by buds issuing

from their bodies, as plants are produced by inoculation, while all may be multiplied by cuttings, and this to a degree of minuteness that exceeds even philosophical perseverance.

With respect to such of this kind as are hatched from the egg little curious can be added, as it is a method of propagation so common to all the tribes of Insect Nature; but with regard to such as are produced like buds from their parent stem, or like cuttings from an original root, their history requires a more detailed explanation. If a polypus be carefully observed in summer, when these animals are chiefly active, and more particularly prepared for propagation it will be found to burgeon forth from different parts of its body several tubercules or little knobs, which grow larger and larger every day; after two or three days inspection, what at first appeared but a small excrescence takes the figure of a small animal, entirely resembling its parent, furnished with feelers, a mouth, and all the apparatus for seizing and digesting its prey. This little creature every day becomes larger, like the parent, to which it continues attached; it spreads its arms to seize upon whatever insect is proper for aliment, and devours it for its own

particular benefit; thus it is possessed of two sources of nourishment, that which it receives from the parent by the tail, and that which it receives from its own industry by the mouth. The food which these animals receive often tinctures the whole body, and upon this occasion the parent is often seen communicating a part of its own fluids to that of its progeny that grows upon it; while, on the contrary, it never receives any tincture, from any substance that is caught and swallowed by its young. If the parent swallows a red worm, which gives a tincture to all its fluids, the young one partakes of the parental colour; but if the latter should seize upon the same prey the parent polypus is no way benefited by the capture, but all the advantage remains with the young one.

But we are not to suppose that the parent is capable of producing only one at a time, several young ones are thus seen at once, of different sizes, growing from its body, some just budding forth, others acquiring their perfect form, and others come to sufficient maturity, and just ready to drop from the original stem to which they had been attached for several days. But what is more extraordinary still, those young ones themselves that continue at-

tached to their parent, are seen to burgeon, and propagate their own young one also, each holding the same dependance upon its respective parent, and possessed of the same advantages that have been already described in the first connection. Thus we see a surprising chain of existence continued, and numbers of animals naturally produced without any union of the sexes, or other previous disposition of nature.

This seems to be the most natural way by which these insects are multiplied; their production from the egg being not so common; and tho' some of this kind are found with a little bladder attached to their bodies, which is supposed to be filled with eggs, which afterwards come to maturity, yet the artificial method of propagating these animals, is much more expeditious and equally certain: It is indifferent whether one of them be cut into ten, or ten hundred parts, each becomes as perfect an animal as that which was originally divided; but it must be observed, that the smaller the part which is thus separated from the rest, the longer it will be in coming to maturity, or in assuming its perfect form. It would be endless to recount the many experiments that have been tried upon this philosophical prodigy;

the animal has been twisted, and turned into all manner of shapes; it has been turned inside out, it as been cut in every division, yet still it continued to move; its parts adapted themselves again to each other, and in a short time it became as voracious and industrious as before.

Besides these kinds mentioned by Mr. Trembley, there are various others which have been lately discovered by the vigilance of succeeding observers, and some of these so strongly resemble a flowering vegetable in their forms, that they have been mistaken by many naturalists for such. Mr. Hughes, the author of the Natural History of Barbadoes, has described a species of this animal, but has mistaken its nature, and called it a sensitive flowering plant; he observed it to take refuge in the holes of rocks, and when undisturbed, to spread forth a number of ramifications, each terminated by a flowery petal which shrunk at the approach of the hand, and withdrew into the hole from whence before it had been seen to issue. This plant however was no other than an animal of the polypus kind, which is not only to be found in Barbadoes, but also on many parts of the coast of Cornwall, and along the shores of the Continent.

CHAP. V.

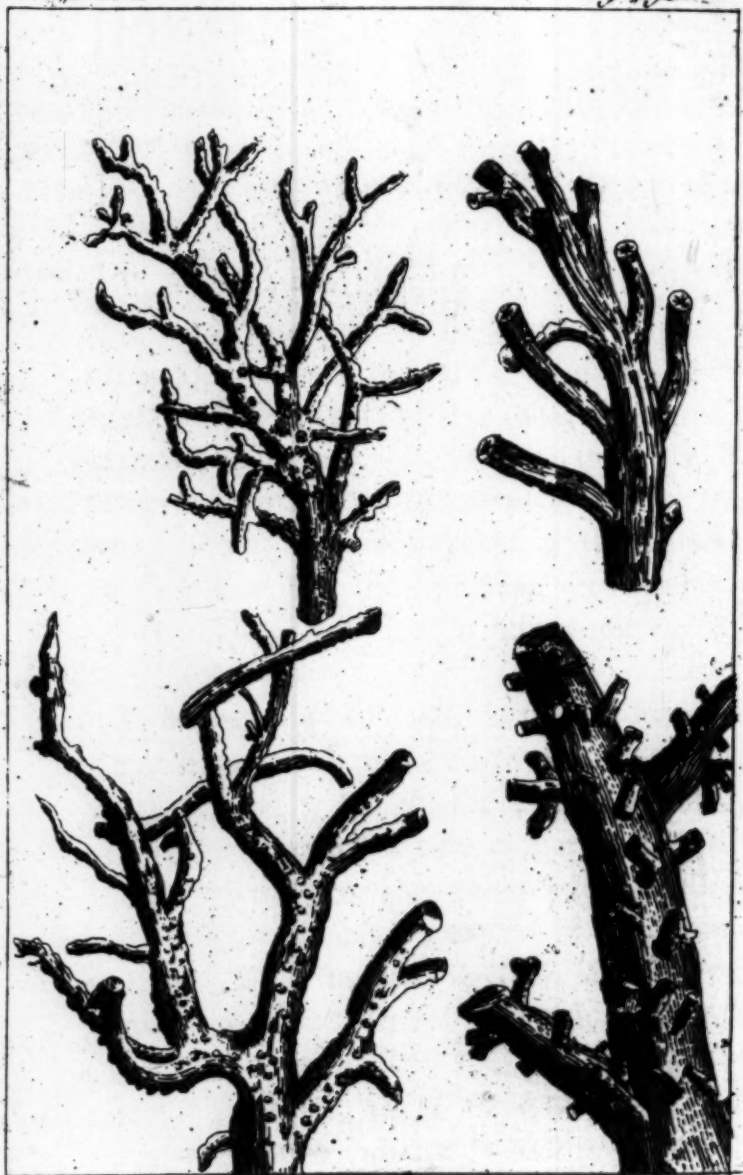
Of the LITHOPHYTES and SPONGES.

IT is very probable that the animals we see, and are acquainted with, bear no manner of proportion to those that are concealed from us. Although every leaf and vegetable swarms with animals upon land, yet at sea, they are still more abundant; for the greatest part of what would seem vegetables growing there, are in fact nothing but the artificial formation of insects, palaces which they have built for their own habitation.

If we examine the bottom of the sea along some shores, and particularly at the mouths of several rivers, we shall find it has the appearance of a forest of trees under water, millions of plants growing in various directions, with their branches entangled in each other, and sometimes standing so thick as to obstruct navigation. The shores of the Persian gulph the whole extent of the Red-sea, and the western coasts of America, are so choaked up in many places with these coralline substances, that tho'



Coral Plant



The Coral Plants

this
fwi
Th
fut
Th
tim
wi
lik
lin
fou
flo
gre
of
tud
var
mit
tive
ent
hav
bee
bra
phe
selv
tion
Ma
leai
ges
tha
V

ships force a passage through them, boats and swimmers find it impossible to make their way. These aquatic groves are formed of different substances, and assume various appearances. The coral-plants, as they are called, sometimes shoot out like trees without leaves in winter; they often spread out a broad surface like a fan, and not uncommonly a large bundling head, like a faggot; sometimes they are found to resemble a plant with leaves and flowers; and often the antlers of a stag, with great exactness and regularity. In other parts of the sea are seen sponges of various magnitude, and extraordinary appearances, assuming a variety of phantastic forms like large mushrooms, mitres, fonts, and flower-pots. To an attentive spectator these various productions seem entirely of the vegetable kind; they seem to have their leaves and their flowers, and have been experimentally known to shoot out branches in the compass of a year. Philosophers, therefore, till of late, thought themselves pretty secure in ascribing these productions to the vegetable kingdom; and Count Marfigli, who has written very laboriously and learnedly upon the subject of corals and sponges, has not hesitated to declare his opinion, that they were plants of the aquatic kind, fur-

nished with flowers and feed, and endued with a vegetation entirely resembling that which is found upon land. This opinion, however, some time after, began to be shaken by Rumphius and Jussieu, and at last by the ingenious Mr. Ellis, who, by a more sagacious and diligent inquiry into Nature, put it past doubt, that corals and sponges were entirely the work of animals, and that like the honey-comb, which was formed by the bee, the coral was the work of an infinite number of reptiles of the polypus kind, whose united labours were thus capable of filling whole tracts of the ocean with those embarrassing tokens of their industry.

If in our researches after the nature of these plants, we should be induced to break off a branch of the coraline substance, and observe it carefully, we shall perceive its whole surface, which is very rugged and irregular, covered with a mucous fluid, and almost in every part studded with little jelly-like drops, which when closely examined, will be found to be no other than reptiles of the polypus kind. These have their motions, their arms, their appetites, exactly resembling those described in the last chapter, but they soon expire when taken out of the sea, and our curiosity is at once stopped in its

LYTHOPHYTES AND SPONGES. 195

career, by the animals ceasing to give any marks of their industry; recourse therefore has been had to other expedients, in order to determine the nature of the inhabitant, as well as the habitation.

If a coralline plant be strictly observed, while still growing in the sea, and the animals upon its surface be not disturbed, either by the agitation of the waters, or the touch of the observer, the little polypi will then be seen in infinite numbers, each issuing from its cell, and in some kinds, the head covered with a little shell, resembling an umbrella, the arms spread abroad, in order to seize its prey, while the hinder part still remains attached to its habitation, from whence it never wholly removes. By this time it is perceived that the number of inhabitants is infinitely greater than was at first suspected; that they are all assiduously employed in the same pursuits, and that they issue from their respective cells, and retire into them at pleasure. Still, however, there are no proofs that those large branches which they inhabit are entirely the construction of such feeble and minute animals. But chemistry will be found to lend a clue to extricate us from our doubts in this particular. Like the shells which are formed by

snails, muscles, and oysters, these coralline substances effervesce with acids, and may therefore well be supposed to partake of the same animal nature. But Mr. Ellis went still farther, and examined their operations, just as they were beginning. Observing an oyster-bed which had been for some time neglected, he there perceived the first rudiments of a coralline plantation, and tufts of various kinds shooting from different parts of this favourable soil. It was upon these he tried his principal experiment. He took out the oysters which were thus furnished with corallines, and placed them in a large wooden vessel, covering them with sea-water. In about an hour, he perceived the animals, which before had been contracted by handling, and had shewn no signs of life, expanding themselves in every direction, and appearing employed in their own natural manner. Perceiving them therefore in this state, his next aim was to preserve them thus expanded, so as to be permanent objects of curiosity. For this purpose he poured, by slow degrees, an equal quantity of boiling-water into the vessel of sea-water in which they were immersed. He then separated each polypus with pincers from its shell, and plunged each separately into small crystal vases, filled with spirit

of wine mixed with water. By this means, the animal was preserved entire, without having time to contract itself, and he thus perceived a variety of kinds, almost equal to that variety of productions which these little animals are seen to form. He has been thus able to perceive and describe fifty different kinds, each of which is seen to possess its own peculiar mode of construction, and to form a coralline that none of the rest can imitate. It is true indeed, that on every coralline substance there are a number of polypi found, no way resembling those which are the directors of the building; these may be called the vagabond race of reptiles, that are only intruders upon the labours of others, and that take possession of habitations, which they have neither art nor power to build for themselves. But in general, the same difference that subsists between the honeycomb of the bee, and the paper-like cells of the wasp, subsists between the different habitations of the corall-making polypi.

With regard to the various forms of these substances, they have obtained different names from the nature of the animal that produced them, or the likeness they bear to some well-known object, such as corallines fungimadrepores, sponges, astroites, and keratophytes.

Though these differ extremely in their outward appearances, yet they all are formed in the same manner by reptiles of various kinds and nature. When examined chemically, they all discover the marks of animal formation; the corals, as was said, dissolve in acids, the sponges burn with an odour strongly resembling that of burnt horn. We are left somewhat at a loss with regard to the precise manner in which this multitude of cells, which at last assume the appearance of a plant or flower, are formed. If we may be led in this subject by analogy, it is most probable, that the substance of coral is produced in the same manner that the shell of the snail grows round it; these little reptiles are each possessed of a slimy matter, which covers its body, and this hardening, as in the snail, becomes an habitation exactly fitted to the body of the animal that is to reside in it; several of these habitations being joined together, form at length a considerable mass, and as most animals are productive, in proportion to their minuteness, so these multiplying in a surprising degree, at length form those extensive forests that cover the bottom of the deep.

Thus all nature seems replete with life; almost every plant on land has its surface covered with millions of these minute creatures,

LYTHOPHYTES AND SPONGES. 199

of whose existence we are certain, but of whose uses we are entirely ignorant; while numbers of what seem plants at sea are not only the receptacles of insects, but also entirely of insect formation. This might have led some late philosophers into an opinion, that all nature was animated, that every, even the most inert mass of matter, was endued with life and sensation, but wanted organs to make those sensations perceptible to the observer: Those opinions, taken up at random, are difficultly maintained, and as difficultly refuted; like combatants that meet in the dark, each party may deal a thousand blows without ever reaching the adversary. Those perhaps are wiser who view Nature as she offers; who, without searching too deeply into the recesses in which she ultimately hides, are contented to take her as she presents herself, and storing their minds with effects, rather than with causes, instead of the embarrassment of systems, about which few agree, are contented with the history of appearances, concerning which, all mankind have but one opinion.



I N D E X

OF THE

Various MATTER contained in this WORK.

The Roman character denotes the volume—the Arabic number the page.

A.

ABDOMINAL Fish, has the ventral nearer the tail than the pectoral fins, vi. 304

Abstemious life, its great benefit, ii. 200

Abstinence, religiously observed long after the Reformation—queen Elizabeth's injunctions upon this head—a heavenly institution, from its benefit to individuals and advantage to society, ii. 131—remarkable instance of it in the sloth, iv. 347

Acanthopterygii, a name of the prickly-finned fish, vi. 303

Achilles, a Roman tribune, called the second of that name; and why, ii. 117.

Acorn, its shell filled by an immovable animal, viii. 162—a shell-fish, vii. 64

Adriatic, its empire claimed by the republic of Venice, i. 232

Ælian, his account of the dreadful cavern, called the Gulf of Pluto, i. 61—has seen an elephant write Latin characters on a board, his keeper shewing him the figure of each letter, iv. 261

Ætna, volcano in Sicily—remarkable eruption in 1537, i. 89—account of it—the burning seen at Malta, 90—the quantity of matter discharged, supposed to exceed twenty times the original bulk of the mountain, 102—walls built of materials thrown up by it, 103

Æolipila, an instrument to produce artificial wind—its description, and the manner of generating violent blasts i. 337

Africa, its sandy storms, i. 363—destroy villages and armies, 366—several animals with four stomachs in Europe, have but two in Africa, ii. 317—the zebra a native of Africa, 390—has the largest and smallest of the cow kind, iii. 14—the ferret originally from Africa, iv. 22—its animals very fierce, and its savages most brutal—they suppose monkeys obstinately dumb to avoid labour, 231—the elephant a native of Africa—the savage inhabitants attempt not to subdue this creature, and wish only to escape its fury; thus it retains liberty in Africa—the natives are greatly degenerated, 267

Age, the mountains of Scotland, Wales, Auvergne, and Switzerland, furnish more instances of old age, than the plains of Holland, Flanders, Germany, or Poland, ii. 202—the age of trees known by the number of their circles, vi. 176—two methods for determining the age of fishes, 176.—the undoubted great age of some fishes, 177

Agouti, an animal found in great abundance in South America, and by some called the rabbit, of that continent; it resembles the rabbit yet is different from ours, and peculiarly to the new world,—its description,—its ordinary food—it has the hair and voraciousness of the hog—eats greedily and hides the remainder—burrows in hollow trees—its manner of feeding and walking—sight and hearing—its flesh, how dressed,—how hunted and forced out of its hole—it turns in its own defence upon the hunters—its bite, and cry—how tamed—bears two young at each litter; breeds at least twice a year; carries its young about it like a cat; and lodges them in a tree, where they soon become able to provide for themselves, iv. 49, to 52

Agricola, has seen hats made of mole skins, most beautiful, iv. 98

Agriculture, the number of hands employed in the manufacture of silk, turned to agriculture, would increase the quantity of corn to more than an equivalent for the diminution of national wealth in purchasing wrought silk from other countries, vi. 284

Al, a name of the sloth—its description, iv. 344

Aicurous, a great parrot—its sagacity and docility, v. 277

Aigues-mortes, town in France, a port in the time of St. Louis; now removed more than four miles from the sea, i. 277

Air, the only active agent in earthquakes, i. 105.—A-monton's calculation of a moderate degree of heat sufficient to give the air amazing powers of expansion, 106—too fine for our sight, is very obvious to our touch—its elasticity,—a cubic foot of air weighs more than an ounce, 299,—four thousand pound weight of air carried at one time more than at another, and why, 303—the air contained in a nut-shell, may be dilated into unknown dimensions—the air contained in a house, may be compressed into a cavity equal to the eye of a needle—the encreasing elasticity of compressed air augmented by heat, would when expanded be sufficient for the explosion of a world, 304—one of the most compounded bodies in nature, 311—scarce any substance resisting its corroding qualities, 312—factitious air produced in great quantities from vegetable, animal, or mineral substances—proves a greater enemy to animals than a vacuum—a bird enclosed in artificial air, from rasins, died in a quarter of a minute—a frog included in artificial air—a snail put into the receiver, with air of paste, died in four minutes, 318 and 319—to be wholesome, should not be of one kind, but a compound of several substances, 320—how air contributes to the support of our lives—dispute upon it, 331, 332—gives life and body to flame, 333—kindles fire into flame, moderates the rays of light, and dispatches their violence—conveyance of sound—all the pleasure received from conversation, or from music, depends entirely upon the air—odours are diffused by the air, 334—a hand upon the mouth of a vessel from which the air has been exhausted, is violently sucked inwards, and why, 300 and 301—the mouth of such vessel inverted being immersed, the water will rise into the empty space, and fill the glass, 301—the manner in which this is done—water never ascends higher than thirty-two feet—our ordinary load of air amounts nearly to forty thousand pounds, 302—vegetables, or the bodies of animals left to putrify, produce air in a very copious manner, 337—it finds admission into wine or other fermented liquors, and most easily into spirits of wine—mountains, minerals, vegetables, animals, and fires, contribute to increase a current of air; 338—a tide of air produced by the sun and moon, 354—a current of air, driven through a contracted space, grows more violent and irresistible, 355—the air at Cusco is so dry and so cold that flesh dries there like wood, without cor-

rupting, ii. 274—fish can live but a few minutes without air, vi. 166—nothing more difficult to be accounted for, than the manner in which they obtain this necessary supply, vi. 167

Air-bladder, in fishes, described, vi. 168

Albatross, a bird of the gull kind—its description by Edwards—is an inhabitant of the tropical climates, and other regions, as far as the straits of Magellan in the South Seas—is the most fierce and formidable of the aquatic tribe; it chiefly pursues the flying-fish, forced from the sea by the dolphins,—Wicquefort's account of this bird, it seems to have a peculiar affection for the penguin, and a pleasure in its society—its nest, vi. 60, to 64

Albours, a famous volcano near mount Taurus, i. 98

Alder, hares will not feed on the bark of it, iv. 7

Algazel, the seventh variety of gazelles with Mr. Buffon, iii. 74

Aldrovandus, places the bats among birds, iv. 134—he having spent a fortune, to enlighten mankind, and collected more truth and falsehood than any man, was reduced to want, to suffer ingratitude, and to die in an hospital, iv. 115

Alexander's soldiers agitated by curiosity and apprehension at the tides in the river Indus, i. 257

Alligator, or the *Cayman*, a kind of Crocodile, vii. 119

Alps, dreadful chasms found in them, i. 59—Pope's description of a traveller straining up the Alps, i. 143—the highest point of them not above sixteen hundred toises above the surface of the sea, 153

Amazons, the greatest river in the world, has its source among the Andes, i. 142—its course from its origin in the lake of Lauricocha, to its discharge into the Western Ocean, is more than twelve hundred leagues, its discharge is through a channel of an hundred and fifty miles broad, after receiving above sixty considerable rivers, 216, 217

Ambergrise, long considered as a substance found floating on the sea, but since discovered to belong to the cachalot—the balls of ambergrise found in all fishes of this kind, but chiefly in the oldest and strongest, vi. 215, 216

Ambrose, (St.) his credulity concerning the halcyon, vi. 140

America, exceeds in the size of its reptiles, but is inferior in its quadrupedes, ii. 332—the black rats, originally from Europe, have propagated greatly in America, and are now

the most noxious animals there, iv. 17—the American mock-bird, assumes the tone of every animal in the wood, from the wolf to the raven, v. 325—its description and habits, 324, 325—Catesby asserts the wolf was the only dog used by the Americans, before they had the Europeans among them—the tapir is the largest animal of America—opinion that all quadrupedes in South America are of a different species from those resembling them in the Old World—and such as peculiarly belonging to that New Continent, are without the marks of the quadrupede perfection, ii. 332, 333—description of the natives of that country, 229—the savages there suppose monkeys to be men, but obstinately dumb, to avoid being compelled to labour, iv. 231—the vampyre, considered as a great pest of South America—and an obstruction to the peopling of many parts of that continent, 146—the manufacturer of stuffs, of the wool of pacas, a very considerable branch of commerce in South America, 317—no rabbits naturally in America—but there are animals, in some measure, resembling the rabbits of Europe, 24—that part of the American continent which lies under the line, is cool and pleasant, ii. 233—cause of the tawny colour of the North American Indians—they paint their skins with red ochre, and anoint them with the fat of bears, 236—the original cause of their flat heads, 239—American wood-duck described, vi. 130

Amia, or *Bonito*, description of this fish, vi. 314

Ammodytes, or the *Lance*, a fish—its description, vi. 311

Ammodytes, a kind of viper—it darts with amazing swiftness, vii. 180

Amonton's calculation proves a moderate degree of heat may give the air amazing powers of expansion, i. 106

Amour, a river of Eastern Tartary, i. 210—it receives about forty lesser rivers, 217

Amphibious quadrupedes have motion in the lower eye-lid alone, ii. 85—general description of that class, iv. 148

Amphisbæna, or the double-headed serpent, vii. 222

Amsterdam, the perfume of the civet sold there is the purest of any, iii. 392

Anarchicas, the wolf-fish, its description vi. 308

Anatomists, puzzled to find parts of the human body superior to those of some apes, ii. 311—none known that have described the lungs of the lamprey, vi. 268

Anchorvy, has no bladder, vi. 171

Andalusia, gennets of that province the best, ii. 357

Andes, amazing chasms of fissures in them—some of these are a mile wide, and others, running under-ground, resemble a province, i. 60—the highest mountains of the world, 99—excellent description of them by Ulloa, —the Andes are by measure three thousand one hundred and thirty-six toises, or fathoms, above the surface of the sea, 151, 153—at the top no difficulty of breathing perceived, 154—manner of mules going down the precipices, ii. 387

Anemometer, an instrument to measure the velocity of the wind—gives no certain information of the force of a storm, i. 356

Angora, The cat of Angora, iii. 212—the goat of Angora, 57—a number of animals about Angora, affording hair for trade—the camblet made of such hair, 58

Anbima, a bird of the crane kind, of Brasil, v. 389—described—the cock and the hen prow! together—when one dies, the other stays by it, and dies also, v. 390

Animals, hold the first rank amidst the infinitely different productions the earth offers, ii. 1,—are endowed with powers of motion and defence, even those fixed to one spot—organized beings provided with some defence for their own security, 2—endued with life and vigour—some, by nature, violent—have their enmities and affections, 4—ultimately supported upon vegetables—those in a dry sunny climate strong and vigorous—different vegetables appropriated to the different appetites,—and why, 5—of domestic kinds, carried from milder countries into the northern climates, quickly degenerate and grow less, 6—in the internal parts of South America and Africa grow to a prodigious size, and why—not so in the cold frozen regions of the North, 6—the most perfect races have the least similitude to the vegetable productions on which they are ultimately fed—the meaner the animal, the more local, 7—assume different habits as well as appearances, and why, 9—some peculiar to every part of the vegetable system—there are that live upon other animals—this wisely so constituted, 11—to diminish the number of animals, and increase that of vegetables, the general scope of human industry—of the vast variety, very few serviceable to man, 12—in a catalogue of more than twenty thousand land animals, scarcely an hun-

dred are any way useful to man, 13—expediency of man's living upon animals as well as vegetables, 14—little more known than that the greatest number require the concurrence of a male and female to reproduce their kind—and these, distinctly and invariably, found to beget creatures of their own species, 16—usual distinction, with respect to the manner of generation, into oviparous and viviparous kinds, 22—the warmth of the sun, or of a stove, efficacious in bringing the animal in the egg to perfection, 27—such parts as the animal has double, or without which it can live, are the latest in production, 35—De Graaf has attended the progress and encrease of various animals in the womb, and minutely marked the changes they undergo, 36—that which, in proportion to its bulk, takes the longest time for production, the most complete when finished—of all others, man the slowest in coming into life, 48—the most formidable are the least fruitful, 49—and why—those which bring forth many engender before they have arrived at half their natural size—approach more to perfection, whose generation nearly resembles that of man, 50—Men and apes the only that have eye-lashes upon the upper and lower lids—all others want them on the lower lid, 85—that which has most desires appears capable of the greatest variety of happiness, 123—those of the forest remain without food several weeks—all endure the wants of sleep and hunger with less injury to health than man—nature contracts the stomachs of carnivorous animals of the forest to suit them to their precarious way of living, 124—but the meaner tribes are still more capable of sustaining life without food, 124, 125—some lower animals seem to spend the greatest part of their lives in sleep, 134—some affected by music—instances of it, 138—those furnished with hands have more understanding than others, 185—in general, the large animals live longer than the little, 200—difference between animals in a state of nature and domestic tameness, so considerable that M. Buffon makes it a principal distinction of classes, 310—their teeth fitted to the nature of their food, 315—and their legs as well fitted to their respective wants or enjoyments, 316—those who chew the cud have four stomachs—several that with us have four stomachs, have but two in Africa, 317—no carnivorous animal, except the dog, makes a voluntary attack but with superiority, 319—the stomach generally

proportioned to the nature of the food, or the ease with which it is obtained; 317—the size of the intestines proportioned to the nature of the food; 318—few of the wild sort seek their prey in the day-time—in proportion as each carnivorous animal wants strength, it uses all the assistance of patience, assiduity, and cunning; 320—some animals carefully avoid their enemies by placing centinels to warn of the approach of danger, and know how to punish such as have neglected their post, or been unmindful of the common safety; 324—the wild sort subject to few alterations, and in the savage state continue for ages the same, in size, shape, and colour; 325—is otherwise when subdued and taken under the protection of man; 325, 327—the tame kind bears no resemblance to its ancestors in the woods; 326—animals feeding only upon grass, rendered carnivorous—two instances, 327—Africa ever remarkable for the fierceness of its animals; 331—the smallest multiply the fastest, 333—the larger sort bring few at a time—seldom generate till they be near their full growth—those which bring many reproduce before they arrive at half their natural size, 335—with all animals, the time of their pregnancy is proportioned to their size—in all kinds, the intermediate letters the most fruitful—the first and last generally produce the fewest in number and worst of kind; 336—natural instinct to choose the proper times of copulation, 337—whatever the natural disposition of animals, they all have courage to defend their young—instances of it, 336—Milk in the carnivorous animals more sparing than in others, 337—choice of situation in bringing forth, remarkable in animals, 338—the ass, in a state of tameness, the most gentle and quiet of all animals, 381—of all animals covered with hair, the ass the least subject to vermin, 386—the zebra the most beautiful, but the wildest animal in nature, 390—perfectly know their enemies, and how to avoid them—instances of it, 395—best method of classing animals adopted by Ray, Klein, and Linnæus, 294, to 299—the author's method of classing them, 301, to 308—the carnivorous seek their food in gloomy solitude,—they are sharper than the ruminating kind, and why—ruminating animals most harmless, and most easily tamed—generally go in herds, for their mutual security—live entirely upon vegetables, iii. 1—the meanest of them unite in each other's defence—carnivorous animals have

small stomachs and short intestines—ruminating animals naturally more indolent and less artful than the carnivorous kinds, and why, 2—their bowels considered as an elaboratory, with proper vessels in it—nature enlarges the capacity of their intestines to take in a greater supply, 3—and furnishes them with four stomachs—the names of these four stomachs, 3, 4—the intestines of carnivorous animals are thin and lean; but those of the ruminating sort strong, fleshy, and well covered with fat, 4—of all others, man spends the least time in eating, 7—of all ruminant, the cow kind deserve the first rank, 8—naturalists give various names to the same, only differing in accidental circumstances—of all, except man, the cow most extensively propagated, 24—greatest variety among cows, none more humble and pliant of disposition, 25—the large kind of the torrid zone very fond of the water, 29—some void their dung, when pursued; this arises rather from fear, than a desire of defence, 32—the number of the cow kind, by naturalists extended to eight or ten sorts, reduced to two; one animal of the cow kind, no naturalist has hitherto described, it may be added as a third species—description of it, 33, 34—all the ruminant internally much alike, 36—those that take refuge under the protection of man, in a few generations become indolent and helpless—the sheep; in a domestic state, the most defenceless and inoffensive, 38—also the most stupid, 40—a great number and variety about Angora; the inhabitants drive a trade with their hair, 58—the kinds actually not distinguished by the horns, colour, position of the ears, or fineness of the hair, 60—the fat, urine, beak, and even dung of various animals efficacious in some disorders; 69—of all in the world, the gazelle has the most beautiful eye, 72—scarce one animal, except the carnivorous, that does not produce concretions in the stomach, intestines, kidneys, bladder, or in the heart, 76—no naturalist informs us whether that which bears the musk, be a ruminant, or of the hog kind, 91—by a general rule, every animal lives about seven or eight times the number of years it continues to grow, 103—of all natives of this climate, none have such a beautiful eye as the stag, 105—no two more nearly allied than the stag and the fallow deer; yet form distinct families, and never engender together, 125—many that once flourished in the world, may now be extinct, 136—of all the deer kind, the rein deer the most extraordinary, and

most useful, 149—of all, when young, none more prettily playful than the kitten, 202—many in Syria and Persia remarkable for long soft hair, 212—most terrestrial are larger, fiercer, and stronger, in warm than in cold or temperate climates, 213—the only not afraid singly to make opposition to the lion, the elephant, the rhinoceros, the tiger, and the hippopotamos, 225—of all American, the tiger the most formidable and mischievous, 245—the generality have greater agility, greater swiftness, and more formidable arms, from nature, than man; and their senses, particularly that of smelling, are far more perfect, 275—those living upon flesh hunt by nature, 276—all under the influence of mah, are subject to great variations, 279—many in this country breed between a dog and a fox, 298—all savage, that have once tasted human flesh, never refrain from pursuing mankind, 336—those of the north, in winter, are more hairy, than those of the milder climates, 356—and what the cause, 355, 356—of the arctic climates, have their winter and summer garments, except as far north as Greenland, 356—of the weasel kind, the martin the most pleasing, 368—feeding entirely upon vegetables, are inoffensive and timorous, 3—remarkable for speed, except the horse, have the hind feet longer than the fore, 4—none receives the male when pregnant, except the hare, 6—hares the only that have hair on the inside of their mouths, 8—few of the wild kind have so many varieties as the squirrel, 25—all are tamed more difficulty in proportion to their cowardice, 72—in all countries, civilized and improved, the lower ranks of animals repressed and degraded, 157—the beaver the only that in its fore parts resembles a quadrupede, and in its hinder parts approaches the nature of fishes, 159—a true judgment of their disposition by their looks, and a just conjecture of their internal habits from their external form, 208—the lori of all others the longest, in proportion to size, 241—the camel the most temperate of all, 303—the ostrich the most voracious, v. 54—of all that use their wings and legs in running, the ostrich is the swiftest, 60—none has greater courage than the cock, opposed to one of his own species, 163—the presence of man destroys the society of meaner animals, and their instincts, also, vi. 65—those longest in the womb, are the longest lived, according to Pliny, 117—none harder to be killed than the shark, 240—the snail kind are hermaphrodites, vii. 30—of all four-footed, the frog the

the best swimmer, 75—the catterpillar has the greatest number of enemies, viii. 43—whatever kind, long under the protection of man, lose part of their natural sagacity, in providing for themselves, 83—that which fills the acorn-shell is immovable, 162—a most numerous tribe lately discovered, propagated by cuttings—many entirely without motion.—all seem possessed of one power, of which vegetables are totally deficient, 162—certain races of animals fall beneath vegetables, by their more imperfect propagation, 163—Some live without limbs, and often reproduce them; some live without brain for many weeks together; some increase and grow large, tho' all their nobler organs are entirely destroyed; some continue to exist, though cut in two, their nobler parts preserving life; while the others perish that were cut away; the zoophyte tribe, continues to live in separate parts, and one animal, by the means of cutting, is divided into two distinct existences, sometimes into a thousand, 170, 171—the first discovery of the power of reproduction in animals owing to Mr. Tremblay, 172

Antelope, tenth variety of gazelles by Mr. Buffon—its description, iii. 78—the Indian antelope, 79

Antilles, (See Negroes ii. 180)

Antlers, their distinct names, iii. 114

Antiparos, its grotto most remarkable, i. 67

Antipathy, of the marmout to the dog, iv. 45—quadrupeds which have natural antipathy against the Norway rat, 69, 70—many have it to some animals, whose presence they instantly perceive by the smell, ii. 182—dogs and wolves so different in their dispositions, that no animals can have a more perfect antipathy, iii. 309—between the porcupine and serpent so irreconcilable as never to meet without a mortal engagement, iv. 111—the same subsists between the jackall and the dog, iii. 338—no animals more alike than the cow and the buffalo, yet, none have stronger dislikes to each other, 26

Antiquity, most naturally looked up to with reverential wonder, ii. 263

St. Anthony, lived an hundred and five years, ii. 132

Ants, their food and excursions, viii. 120—their eggs so very small, that upon a black ground, they can scarcely be discerned, 121—fond attachment of the working ants to to their progeny, 122—the aurelia state, and efforts to get

rid of their skins—experiment of Mr. de Geer to this purpose, 123—state of the female, after she has done laying, not known; the males then fly away and are heard of no more, 124—ants of the tropical climates build a hill with great contrivance and regularity, lay up provisions; and, living the whole year, submit to regulations entirely different from the ants of Europe—three kinds of African ants—their hills from six to twelve feet high, 125—amazing number and regularity of their cells—depredations and adventures—they live under strict regulations—order in which they sally forth—often quit their dwelling in a body, and go in quest of adventures, 126—an instance of it given by Smith, 127—their sting produces extreme pain, 125—every writer of antiquity describes this insect, as labouring in the summer, and feasting upon the produce during winter; in some of the warmer climates this may be so; but in France and England they are in a state of torpidity during winter, 115, 116, 124, 125—common ants of Europe—their description, 116—fears not to attack a creature ten times its own magnitude, 117—are divided into males, females, and neutral or working tribe—in what manner distinguished from each other—males and females seem no way to partake in the common drudgeries of the state; males pursue the females with great assiduity, and force them to compliance—remain coupled for some time, 118—description of the ant-hills in southern parts of Europe constructed with wonderful contrivance, 119—drive the hare from its form, iv. 12—many animals live upon ants in Africa and America, 338

Ants, the ant-lion, vii. 323

Ant-eater, or *Ant-bear*, description and habits, iv. 339, 340—their art to catch the ants—manner of defence against its enemies, 342—kills the invader, and remains fastened upon him with vindictive desperation, 345

Antioch, buried by an earthquake, i. 110

Aorta, the great artery, ii. 41

Apeea, by some the Brazilian rabbit, iv. 54—Its description, 55

Apes, the foremost of the kind is the ouran-outang or wild man of the woods, iv. 189—description of this animal by Dr. Tyson, 191, 193, 195—comparative view of this creature with man, 191 to 94—another description of it by Mr. Buffon, 195, 196—two young ones, but a year old, dis-

covered an astonishing power of imitation, 197—a kind called *baris*, properly instructed when young, serve as useful domestics, 198—Le Comte's account of an ape in the straits of Molucca, 198—the long armed ape an extraordinary and remarkable creature, 206—its description—a native of the East Indies, and found along the coasts of Comorandel, 207—fling themselves from one rope to another, at thirty, forty, and fifty feet distance, 199—instances of amazing nimbleness—in a state of nature they run upon all fours—certain proofs of it, 205—in some of the kind the resemblance to man so striking, that anatomists are puzzled to find in what part of the human body man's superiority consists, ii. 311—enjoy many advantages in common with men, above the lower tribes of nature, 311—in the navies of Solomon, among the articles imported from the East, are apes and peacocks, v. 171—apes have eye-lashes upon the upper and lower lids, ii. 85—slight survey of the ape kind, iv. 188—the only animal possessed of hands and arms, ii. 105

Apicius, noted for having taught mankind to suffocate fish in Carthaginian pickle, vi. 180—his receipt for making sauce for the ostrich, v. 59—manner of dressing a hare in true Roman taste, with parsley, rice, vinegar, cumin, and coriander seed, iv. 15

Apodal, the name of the fish without ventral fins, vi. 300

Appendices in the intestines of birds, v. 16

Appetite, nature, by supplying a variety, has multiplied life in her productions, v. 79

Arabia, of all the countries in the world, where the horse runs wild, produces the most beautiful breed, the most generous, swift, and persevering—in the rapidity of flight the dogs give up the pursuit, ii. 347—method of taking them by traps, 348—an Arabian, how poor soever, is provided of his horse, 349—the Arabians first began the management of horses in the time of Sheque Ismael—manner in which the Arabians feed and dress their horses, 352—they have no house but a tent to live in—never beat their horses, 351—preserve the pedigree of their horses with care for several ages back, 350—into what countries that race of horses has spread itself, 354, 355—the Arabians feast upon young horses, 348—keep their horses ready saddled at the tent, from morning till sun-set, to be prepared against all

surprise, 253—the most adapted country to the support and production of camels, iv. 303—description of the deserts of Arabia, 305—milk and flesh of the camel a part of the nourishment of the Arabians, 304—the mare, foal, husband, wife, and children, lie altogether indiscriminately, ii. 351—its sandy tempests described, i. 363—men and animals buried in the sands of Arabia, preserved from corruption, for several ages, as if actually embalmed, ii. 275—the ass originally a native of Arabia, ii. 385

Archimedes, discovered the method of determining the purity of gold, by weighing in water, i. 190

Archipelago, very good horses in its islands, ii. 360—the wild ass found in those islands, particularly in Cerigo, 377

Ardebil, the pastures in those plains excellent for rearing horses, ii. 361

Arequipa, a celebrated burning mountain in Peru, i. 99

Argentine, description of this fish, vi. 309

Arion, his harp gathered the dolphins to the ship's side, ii. 168

Aristotle's opinion about the formation of the incipient animal, ii. 16—and mules being sometimes prolific, 375

Arlotta, an Italian Franciscan friar—for his sleeping transgressions taken before the Inquisition, and like to be condemned for them, ii. 142, 143

Armadilla, or *Taton*, described—an inhabitant of South America, iv. 125—a harmless creature, furnished with a peculiar covering for its defence—attacked without danger, and liable to persecutions—is of different sizes; in all however, the animal is partially covered with a coat of mail, a striking curiosity in natural history, 125, 126—has the same method of protecting itself as the hedge-hog or pangolin—when attacked, rolls itself up in its shells, like a ball, and continues so till the danger is over, 127, 128—the Indians take it in this form, lay it close to the fire, and oblige it to unfold—this animal utterly unknown before the discovery of America, 128, 129—does mischief in gardens—beats the cold of our climate without inconvenience—the mole does not burrow swifter than the armadilla—burrows deep in the earth, 129—expedients used to force them out,—manner of taking them alive—sometimes in snares by the sides of rivers, and low moist places which they frequent, 130, 131—never found at any distance from their retreats—near a precipice,

escapes by rolling itself up, and tumbling down from rock to rock, without danger or inconvenience, 130—its food—scarce any that do not root the ground like a hog—a kind of friendship between them and the rattle-snake, they are frequently found in the same hole, 131—they all resemble each other, as cloathed with a shell, yet differ in size, and in the division of their shell—the various kinds, 132, 133—the pig-headed sort, the weasel-headed, the kabassou, and the encoubert are the largest, 133—generally referred to the tribe of insects or snails, ii. 313

Arno, the river, a considerable piece of ground gained at the mouth of it, i. 276

Aro, numbers of birds of paradise seen there, v. 260

Arse-feet, name our sailors give to birds of the penguin tribe, vi. 92

Arsenius, tutor to the emperour Arcadius, lived an hundred and twenty years, ii. 132

Arts, fault that has infected most of our dictionaries and compilations of natural history, ii. 307—teaching the arts of cruelty equivalent to committing them, v. 164

Asia, aim of the Asiatics to possess many women, and to furnish a seraglio their only ambition, ii. 72—lustre of jewels and splendour of brilliant colours eagerly sought after by all conditions of men, 98

Asia, Minor, description of its inhabitants, ii. 230

Asiatic, the olive-coloured, claims the hereditary resemblance to our common parent—an argument to prove the contrary, ii. 240

Asp, a kind of serpent, vii. 215

Asphaltum, an injection of petroleum and an application of asphaltum suffice to make a mummy, ii. 287

Asi, and horse, though nearly alike in form, are distinct kinds, different in natures—with only one of each kind, both races would be extinguished, ii. 375—in the state of nature entirely different, 376—wild asis in greater abundance than the wild horse—wild asis and the zebra a different species—countries where the wild asis is found, 377, 379—some run so swift, few coursers can overtake them,—caught with traps—taken chiefly for their flesh and skins, which make that leather called shagreen—entertainment of wild asies in Persia seen by Olearius, 377, 378—the delicacy of its flesh a proverb there, 378—Galen deems it unwholesome

—asses originally imported into America by the Spaniards, have run wild, and multiplied to such numbers as to be a nuisance—chace of them in the kingdom of Quito, 379—have all the swiftness of horses—declivities and precipices do not retard their career, - after the first load, their celerity leaves them, their dangerous ferocity lost, and they contract the stupid look and dullness peculiar to the asinine specie—will not permit a horse to live among them—always feed together—and a horse straying where they graze, they fall upon, and bite and kick him till he be dead, 380—their preference to any vegetable is to the plantane, 381—they drink as soberly as they eat, and never dip the nose into the stream—fear to wet their feet, and turn out to avoid the dirty parts of a road—shew no ardour but for the female, and often die after covering, 382—scent an owner at a distance, and distinguish him in a crowd—with eyes covered, they will not stir a step—when laid down, one eye covered with the grass, and the other hidden with a stone or other contiguous body, they will not stir, or attempt to rise, to get free from impediments—several brought up to perform, and exhibited at a show, 383—suffered to dwindle every generation, and particularly in England, 384—bulk for bulk, an ass stronger than a horse, and surer footed—also less apt to start than the horse, 385—more healthy than the horse—Persians cleave their nostrils to give them more room for breathing, 386—Spaniards alone know the value of the ass, 385—the Spanish jack-ass above fifteen hands high—the ass originally a native of Arabia—warm climates produce the largest and best—entirely lost among us during the reign of queen Elizabeth—Hollingshed pretends our land yields no asses, yet they were common in England before that time—in Sweden, they are a sort of rarity—by the last history of Norway, they had not reached that country—in Guinea, they are larger and more beautiful than the horses of that country—in Persia, are two kinds—some sold for forty or fifty pounds, 385, 386—no animal covered with hair less subject to vermin—lives till twenty or twenty-five sleeps less than the horse, and never lies down for it, unless much tired—the ass crosses fire and water to protect her young, 382 to 386—the gimerro bred between the ass and the bull, 386—the size and strength of our asses improved by

importation of Spanish jack-asses, 387—destroyed by the South-America bat, called vampyre, iv. 145

Asafetida, savage nations delighted with the smell, ii. 181

Assiniboils, lake, where the river St. Lawrence takes its rise, i. 216

Assyrian goat, of Gesner, a second variety, iii. 58

Asteroites, among coral substances, viii. 197

Atalanta, an island submersed, was as large as Asia Minor and Syria—the fruits of the earth offered without cultivated, i. 134

Athanasius, instance of his strength, ii. 118

Atellanus, prohibited the exportation of mares and stallions, except as presents, ii. 309

Atterians, quail-fighting a favourite amusement among them—abstained from the flesh of this bird, as unwholesome, because it fed upon the white hellebore—they reared great numbers of them for fighting, and staked sums of money, as we do with cocks, upon the success of the combat, v. 214—they had also their cock-matches, v. 163

Atherine, description of this fish, vi. 313

Atmosphere, most disorders incident to mankind, says Bacon, arise from changes of the atmosphere, vi. 175

Attraction, defined, i. 3—the sun possessed of the greatest share, i. 4

Avocetta, or scooper, a bird found in Italy—now and then comes over into England—description, and extraordinary shape of its bill, vi. 20

Aurelia, one of the appearances of the caterpillar, viii. 6, 19—lying it in a warm room, Mr. Reaumur hastened the disclosure of the butterfly, and by keeping it in an ice-house, retarded it—though it bears a different appearance, it contains all the parts of the butterfly in perfect formation—some insects continue under that form not above ten days, some twenty, some several months, others for a year together, 26—how the butterfly gets rid of that covering, 28—*aurelia* of the bee different from that of the common caterpillar, 80

Aurora Borealis, or northern light, streams, with peculiar lustre, and a variety of colours round the pole—its appearance almost constant in winter—and when the sun departs for half a year, this meteor supplies its beams, affording light for all the purposes of existence, i. 387

Aurora, or the samiri, the smallest and most beautiful of the sapajou monkeys—its description—is very tender, delicate, and held in high price, iv. 236

Auvergne, in France, an amazing mummy dug up at that place, ii. 283

Awk, a bird bred in the island of St. Kilda, vi. 98

Axis, a kind of beautiful stag—its description, iii. 123

Azoris, serpents, adders, and snakes seen about these islands by Sir Robert Hawkins in 1590, i. 239

B.

Baboon, fierce, malicious, ignorant, and untractable, iv. 209—its description—impelled by a hatred for the males of the human species, and a desire for women, 210—the Chevalier Forbin relates, that in Siam, whole troops will fallly forth, plunder the houses of provisions, and endeavour to force the women—manner of robbing an orchard or vineyard at the Cape of Good Hope, 210, 211—the female brings forth one at a time, carries it in her arms, clinging to her breast, 214—survey of the baboon kind, 188—at the Cape of Good Hope, the young of these animals are taught to guard houses, and perform the duty with punctuality, 212—they seem insensible of the mischief they do—a baboon described by Mr. Buffon, 213—lasciviousness predominant—their food, 214—are not found to breed in our climate, 213—are not carnivorous—their liver, like that of a dog, divided into six lobes—the largest of the kind is the mandril, 214—its description—displeased, it weeps like a child—is a native of the Gold Coast—that called wanderow chiefly seen in the woods of Ceylon and Malabar—its description—the maimon of Buffon, by Edwards called the pig-tail, the last of the sort—its description—a native of Sumatra, 214, 215

Baby, the name of a dwarf, whose complete history is very accurately related by Mr. Dabenton, ii. 254

Babyroussa, the Indian hog, its description, iii. 193 to 195—travellers call it the hog of Borneo, 192—in what manner it escapes the pursuers, 195—has enormous tusks of fine ivory—less dangerous than the wild boar, 194—the tusks have points directed to the eyes, and sometimes grow into them—these animals, in a body, are seen with the wild boars, with which they are not known to engender—are easily tamed—have a way of reposing different from other

animals of the larger kind, by hitching one of their upper upper on the branch of a tree, and suffering their whole body to swing down at ease—they are fierce and terrible when offended, and peaceable and harmless when unmolested—their flesh good to be eaten, but said to putrefy in a short time—they chiefly live upon vegetables and the leaves of trees, 195—are found in the island of Borneo, and in other parts of Asia, and Africa, 196

Bacon's observations upon fishes, vi. 175

Badger, a solitary stupid animal, iv. 328—forms a winding hole, and remains in safety at the bottom—the fox takes possession of the hole quitted by the badger, or forces it from the retreat by wiles—surprised by the dogs at a distance from its hole, it fights with desperate resolution, 329—all that has life is its food—it sleeps the greatest part of its time, and though not voracious, keeps fat, particularly in winter—it keeps the hole very clear—the female makes a bed of hay for her young, 328, 329—brings forth, in summer, three or four young—how she feeds them—the young are easily tamed—the old are savage and incorrigible—are fond of fire, and often burn themselves dangerously, 329, 330—are subject to the mange, and have a gland under the tail, which scents strongly—its flesh rank and ill tasted, 330

Bag, name of the false belly of the opossum—its description, iv. 343

Bag, or pouch of the civet, manner in which the perfume is taken from it, iii. 391—this bag differs from that of the rest of the weasel kind, and in what, 390

Bait, the best for all kinds of fish is fresh herring, vi. 253—the larger sort will take a living small fish upon the hook sooner than any other bait, 254

Balance, to determine the specific gravity of metals, i. 190

Bald, women less apt to become bald than men—Mr. Buffon thinks they never become bald—many instances of the contrary among us, ii. 86

Balearic crane, its description, v. 387—the real crane of Pliny, 386—comes from the coast of Africa and Cape de Verd islands, 388—its habits—has been described by the name of sea-peacock—foreign birds of the crane kind described, the jabiru, the jubira-guacu, the anhima, and the buffoon bird, 388, 389

- Ball of fire* of the bigness of a bomb—its effects, i. 380
- Baltic*, the Danes in possession of it, i. 232
- Banks*, of a river, after inundations, appear above water, when all the adjacent valley is overflown, and why, i. 202, 203
- Banks* (Mr.) discovers and describes an extraordinary animal of the gerbua kind, and calls it kangaroo, in figure resembling, but in size and other circumstances differing with it, iv. 351
- Banana*, the elephant eats the plant to the roots, iv. 259
- Barb*, an Arabian horse bred in Barbary, ii. 354
- Barbs*, of the whale, or whale-bone, vi. 196
- Barbary-hen*, its description, v. 192
- Barble*, a flat fish, its growth, vi. 340
- Barje*, in South America, cattle destroyed at that place by the American bats called vampyres, iv. 146
- Baris*, in Sierra Leona, in Africa, has a kind of apes, which, properly instructed when young, serve as very useful domestics, iv. 198
- Barnacle*, imaginary, a shell fish, vii. 64
- Barometer* measures the weight of the air—in what manner, i. 304, et seq.—no changes in the air without sensible alteration in the barometer—the barometer is also serviceable in measuring the heights of mountains, 154, 305, 306—when it marks a peculiar lightness in the air, no wonder that it foretells a storm, and why, 352—the art of taking the heights of places by it, a new and ingenious invention, 154—in what manner it is composed, 304
- Barrettier*, a famous youth, considered as a prodigy of learning at the age of fourteen, slept regularly twelve hours in the twenty-four, ii. 138
- Basi*, a rocky island in the Firth of Forth, has in every crag innumerable birds of various sorts, shining more than the stars of heaven in a serene night, vi. 72
- Bath*, persons coming out of a warm bath several ounces heavier than they went in—warm bath of sea-water a kind of relief to mariners, upon a failure of fresh water at sea, i. 238
- Bat*, by some reckoned among birds, ii. 313—doubtful among naturalists whether beast or bird—now universally take place among quadrupedes, iv. 134—Pliny, Gesner, and Aldrovandus placed it among birds—scarce in any particu-

lar resembles the bird, except in the power of sustaining itself in the air—description of the common sort in England—its intestines and skeleton, in some measure, resemble those of mankind, 135—makes its first appearance early in summer, and begins its flight in the evening, 136—is seen to skim along the surface of waters—feeds upon gnats, moths, and nocturnal insects of every kind, which it pursues open-mouthed—its flight laborious, irregular, and, if interrupted, not readily followed by a second elevation—usually taken, when striking against an object, it falls to the ground—even in the summer, it sleeps the greatest part of the time—its retreat—continues in a torpid state during winter—is usually hanging by its hooked claws to the roofs of caves, unaffected by all change of weather, 136, 137—is destroyed particularly by the owl—the bat couples and brings forth in summer from two to five young at a time, 138—the female has two nipples forward on the breast, as in the human-kind, and this a motive for Linnæus to give it the title of a primas, to rank it in the same order with mankind—the female makes no nest for her young—when she begins to grow hungry, and finds a necessity of stirring abroad, she takes her little ones andicks them by their hooks against the sides of her apartment, and there they immoveably cling and patiently wait her return—less similitude to the race of birds than of quadrupeds, iv. 138, 139—great labour in flying soon fatigues and tires it in less than an hour—its petty thefts upon the fat of bacon, 140—found in the holes deserted by the wood-pecker, v. 253—long-eared bat, iv. 140—horse-shoe bat—rhinoceros bat—a larger race of bats in the East and West Indies truly formidable—a dangerous enemy—when united in flocks they become dreadful, 141, 140—they are eat—the negroes of the African coasts will not eat them though starving, 141—on the African coast they fly in such numbers, as to obscure the setting sun—the roufette, or great bat of Madagascar, is found along the coasts of Africa and Malabar, where it is often seen about the size of a large hen—destroys the ripe fruits, and sometimes settles upon animals, and man himself, 142—destroy fowls and domestic animals, unless preserved with the utmost care, and often fasten upon the inhabitants, attack them in the face, and make terrible wounds, 143—the ancients have taken their idea of harpies from these fieres

and voracious creatures, equally deformed, greedy, uncleanly, and cruel—the bat, called the American vampyre—its description by Ulloa—purport of his account confirmed by various travellers, who all agree that it has a faculty of drawing blood from persons sleeping, and destroying them before they awake, 144—a strong difficulty remains how they make the wound—Ulloa and Buffon's opinions 145—suppose the animal endowed with a strong power of suction; and that, without inflicting any wound, by continuing to draw, it enlarges the pores of the skin, so that the blood at length passes—they are one of the great pests of South America, 146—bats as big as rabbits, ii. 6

To bay, said of a stag, when he turns his head against the hounds, iii. 114

Beagle, harrier and hound seem all of the same kind, iii. 283—transported into Spain or Barbary, will there be converted into the land or water spaniel, 284

Beak, how that of animals is produced, ii. 101

Beam, by hunters meant that part which bears the antlers, iii. 114

Beams, those of the sun shining upon the fire, put it out, and why, i. 333, 334—darting directly upon us, without the medium of the air, would burn us up at once, or blind us with effulgence, i. 334.

Bear, description of the ant-bear and its habits, iv. 339, 341

Bears in cold frozen regions of the North not smaller than in milder countries, ii. 6—the North American Indians anoint their skins with fat of bears, 236—the bears now and then make depredations upon the rein-deer, iii. 169—in Greenland do not change colour, 356—three different kinds, iv. 321—the black of America does not reject animal food, as believed—places where they are found—retreat of the brown bear, 322—a vulgar error, that during winter, the brown bear lives by sucking its paws; it seems rather to subsist then upon the exuberance of its former flesh—the male and female do not inhabit the same den, and seldom are seen together, but upon the accesses of genial desire, 323—care of the female for her young—the bear, when tamed, seems gentle and placid; yet still to be distrusted and managed with caution, being often treacherous and resentful without a cause, 323—is capable of a degree of instruction

—when come to maturity, can never be tamed—methods of taking them, 324, 327—their paws and hams a great delicacy, iv. 324, 327—the white placed in the coldest climates, grows larger than in the temperate zones, and remains master of the icy mountains in Spitzbergen and Greenland, 325—unable to retreat when attacked with fire arms, they make a fierce and long resistance, 326—they live upon fish and seals, their flesh is too strong for food—are often seen on ice-floats, several leagues at sea, tho' bad swimmers, 327—the white sometimes jumps into a Greenlander's boat, and if he does not overset it, sits down calmly and like a passenger suffers itself to be rowed along, 326—hunger makes it swim after fish—often a battle ensues between a bear and a morse, or a whale, and the latter generally prove victorious, 327

Beards, Americans taking great pains to pluck theirs up by the roots, the under part, and all but the whiskers, therefore supposed to have no hair growing on that part—Linnæus himself has fallen into this mistake, ii. 97—different customs of men, in the manner of wearing their beards, 95, 6, 7

Beasts are most fierce and cruel in all countries where men are most barbarous, ii. 330

Beasts of chase, in the reigns of William Rufus, and Henry the First, it was less criminal to destroy one of the human species than a beast of chase—sacred edifices thrown down, and turned to waste, to make room for beasts of chase, iii. 110

Beasts of prey, seldom devour each other—they chiefly seek after the deer or the goat—their usual method of hunting, ii. 321

Beaver, known to build like an architect, and rule like a citizen, ii. 328—its fore parts taste like flesh, and the hinder like the fish it feeds on, iii. 192—a remaining monument of brutal society, iv. 157—its qualities, taken from its fellows, and kept in solitude or domestic tameness, 158, 159—resists only when driven to extremity, and fights when its speed cannot avail—the only quadrupede that has a flat broad tail, covered with scales, serving as a rudder to direct its motions in the water, 159—the sole quadrupede with membranes between the toes on the hind feet, and none on the fore feet, 159—the only animal in its fore parts entirely re-

resembling a quadrupede, and in its hinder parts approaches the nature of fishes, having a scaly tail—its description—has but one vent for the emission of excrements and urine, 159, 160—they assemble about the months of June and July, make a society to continue the greatest part of the year—form a company of above two hundred—fix their abode by the side of a lake or river—cut with their teeth a tree thicker than a man's body, iv. 160, 161—amazing works and mansion houses—convey their materials by water, iv. 162—mix clay and dry grass together, work it into a mortar, and with their tails plaster their work within and without, 164—their walls perpendicular, and two feet thick—their piers four-score or an hundred feet long, and ten or twelve feet thick at the base, 161—their dikes ten and twelve feet thick at the foundation—their apartments round, or oval, and divided into three stories, one above the other, 163—visited too often by men, they work only in the night time, or abandon the place, and seek a safer situation, 163—four hundred reside in one mansion house, divided into a number of apartments, having communication with each other, 165—their works in the northern parts finished in August or September—in summer they are epicures—their provisions for the winter season—they drive piles into the earth, to fence and fortify their habitation against the wind and water, 164—cut down branches three to ten feet in length—the largest are conveyed to their magazines by a whole body—the smallest by one only—each taking a different way, and having walk assigned him, that no one should interrupt another in his work, 165, 166—wood-yards larger or smaller, in proportion to the number in family, 166—manner of catching them in snares or by surprise, 167—they swim with their mortar on their tails, and their stakes between their teeth, 162—their works damaged by force of water, or feet of huntmen, instantly repaired, iv. 163.

Beauty, every country has peculiar ideas of beauty—extraordinary tastes for beauty, ii. 76—every nation, how barbarous soever, has peculiar arts of heightening beauty—several of these arts, 78—a modern lady's face formed exactly like the Venus of Medicis, or the sleeping Vestal, would scarce be considered as a beauty, except by the lovers of antiquity—less in the object than in the eye of the beholder—superior beauty of our ancestors not easily comparable, 165.

Beccafico, a bird of the sparrow kind, v. 314

Bed, of a river, an increase of water there increases its rapidity, except in cases of inundation, and why—such bed left dry for some hours by a violent storm blowing directly against the stream, i. 207

Beds, the earth every where in beds over beds, and each of them maintaining exactly the same thickness, i. 58

Bee, a ruminating insect, or seemingly so—its stomach is composed of muscular fibres, iii. 6—operations studied for two thousand years are still incompletely known, viii. 65—Reaumur's account sufficiently wonderful—many of the facts held dubious by those conversant with the subject—some declared not to have existence in nature—three different kinds of bees, 65, 66—common working bees neither male nor female—queen bees lay all the eggs that are hatched in a season—structure of the working bee, particularly of its trunk, which extracts the honey from flowers, 66, 67—manner of building their cells, 69—in one day, they make cells upon each other enough to contain three thousand bees, 70—description of those cells, 69, 70.—the combs made by insensible degrees, not at once as some imagine, 72—the cells for the young and for the drones—that for the queen bee the largest of all, 73—those for honey are deeper than the rest—that not the only food upon which they subsist—manner of anticipating the progress of vegetation, 74—the bee has a stomach for wax as well as honey—bee-bread—treacle for food of bees in winter—what part of the flower has the honey, 74, 75—sting of the bee, 68—any wanting food, bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth, 70—numerous as the multitude of bees appear in a swarm, they all owe their origin to one parent, called the queen-bee, 76—opening the body of a queen, the eggs at one time found to amount to five thousand—the queen easily distinguished from the rest—great fertility of the queen, and the great attentions paid to her, controverted by recent observers, 77—they leave a cell to every egg and destroy the rest, 78—great care and affection for the young, 79—in about twenty days after the egg was laid, the bee was completely formed, and fitted to undergo the fatigues of its state—the cell being prepared, the animal soon transform-

ed into an aurelia different from that of the common caterpillar, 80—when they begin to break their prisons, above an hundred are excluded in one day, 81—dreadful battles often ensue between the young brood and their progenitors, 82—signs previous to their migrations—after the migration, the queen being settled, the swarm follows, and in a quarter of an hour, the whole body is at ease, 84—sometimes sacrifice their queen; but never when the hive is full of wax and honey, 84, 85—the working sort kill the drones in the worm-state, in the cell, and eject their bodies from the hive among the general carnage—upwards of forty thousand bees found in a single hive—instances of expedition in working—in the first fifteen days, they make more wax than during the rest of the year—a hive sending out several swarms in the year, the first always the best and most numerous, 86—a kind of floating bee-house used in France, 87

Bees, in other countries—in Guadaloupe are less by half than in Europe, and have no sting, viii. 89, 90—sometimes there are two or three queens to a swarm; then the weaker deserted for the more powerful protector—the deserted queen does not survive the defeat—is destroyed by the jealous rival; and till this be done, the bees never go out to work, 84—at Guadaloupe their cells are in hollow trees, sometimes with a sort of waxen-house, shaped like a pear, in which they lodge their honey, and lay their eggs, 90—their honey never congeals, is fluid as oil, and has the colour of amber—in the tropical climates are black bees without a sting—their wax is soft, and only used for medicinal purposes, not being hard enough for candles as in Europe—whether the humble bees have a queen or not, there is one much larger than the rest, without wings, without hair, all over black, like polished ebony—this views all the works, from time to time, 87—their habits—the honey gathered by the humble bees neither so fine, so good, nor the wax so clear, or so capable of fusion, as those of the common bees, 92.

Leaf-cutting Bees make their nest, and lay their eggs among bits of leaves, viii. 94

Wall-bees, so called, because they make their nests in walls—the male and females are of a size—the former without a sting, viii. 94, 95

Wood-bee—*Mason-bee*, viii. 92, 93—*Ground-bee* builds its nest in the earth—the patience and assiduity of their labour, 93.

Beetles, their general characteristics, viii. 128, 137—their kinds distinguished from each other, 129—description of the dor-beetle or the May-bug, 136—how the two sexes in the May-bug are distinguished from each other,—season of their coupling, 131—the female bores a hole into the ground, where to deposit her burthen; and when lightened of it ascends from the hole to live as before—their eggs—description of the insect, and of its manner of life in the worm state—continues in that state for more than three years, changing every year its skin, and living under the ground without eyes—in what manner it assumes the form of a chrysalis, 133—time when it becomes winged, and completely formed—the old one never survives the season—and dies from the severity of cold in winter, 134—its habits and food, when completely formed—number of their eggs, 135—rooks and hogs particularly fond of them, and devour them in great numbers, 136—instances of great devastations made by the May-bug—description and habits of that beetle which the Americans call the tumble-dung, 137, 138—the insect called the king of the beetles, 138—description of the elephant-beetle—the largest of this kind hitherto known, 139—a ruminating insect, or seems to ruminate, iii. 6

Beggars, a question in the schools, which the most happy man, the beggar by night, and king by day; or the beggar by day, and king by night, ii. 139

Belcher (Mr.) the first who discovered the circulation of the blood through the bones—experiments to this purpose, ii. 194

Belagme (Roger de) the first who attempted to mend our native breed of horses, ii. 370

Bell, the great diving-bell improved by doctor Halley—he could write or read in it when the sea was clear, and especially when the sun shone, i. 291

Bell, When the stag cries, he is said to bell, iii. 113

Bells, their vibrations not heard under the receiver of an air-pump, i. 334

Belly, a minute description of the false belly of the opossum, iv. 243, *et seq.*

Berries, the Laplanders drink water, in which juniper-berries have been infused, ii. 216

Bewailer, or the sai, a monkey of the new continent, iv. 236

Bezoar, German bezoar, iii. 69

Bezoar-goat, the oriental bezoar, iii. 74, *et seq.*—cow-bezoar, and monkey-bezoar, 76—hog bezoar, 77

Billiting, a name given by the huntsmen to the excrement of the fox, iii. 328

Birch, hares are particularly fond of it, iv. 7

Birds, all produced from the egg, ii. 26— their lower eyelid alone has motion, 85— have the neck longer than any other kind of animals—those which have short claws, have also short necks—those that have long claws have the neck in proportion, 102—have a power of disgorging food to feed their young—ruminating birds, iii. 5—many kinds which the dog will not touch, 304—hunters often informed by the birds of the place of retreat of the fox, 351—a flock of small birds often alarms every thicket, and directs the hunter to the martin, 372—surpass fishes and insects in structure of body, and in sagacity, v. 2—their anatomy and conformation, 3, *et seq.*—compared to a ship making way through water, 4—are furnished with a gland behind, containing a proper quantity of oil—to what purpose—description of their feathers, 6—the pectoral muscles of quadrupeds trifling to those of birds—chuse to rise against the wind—and why, 8—all, except the nocturnal, have the head smaller, and less in proportion to the body, than quadrupeds, 9—their sight exceeds most other animals, and excels in strength and precision, 10—have no external ear standing out from the head the feathers encompassing the ear-holes, supply the defect of the exterior ear—the extreme delicacy of their sense of hearing, is easily proved by their readiness in learning tunes, or repeating words, and the exactness of their pronunciation—their delicacy in the sense of smelling—instance of it in ducks, 11—the tail guides their flight like a rudder, and assists them either in the ascent, or descent, 12—wonderful internal conformation—the wind-pipe often makes many convolutions within the body of the bird, and is then called the labyrinth, 13—of what use these convolutions are, no naturalists has been able to account—this difference obtains in birds to all appearance of the same species—whence some derive that loud and various modulation in their warblings is not easily accounted for—birds have much louder voices, in respect to their bulk, than animals of other kinds—all have properly but one stomach, but different in different kinds, 14—the organs of

digestion in a manner reversed in birds—why they pick up sand, gravel, and other hard substances—most have two appendices or blind guts—in quadrupedes always found single, 16—all birds want a bladder for urine—their urine differs from that of other animals, 17—effects of the annual molting which birds suffer,—their molting time artificially accelerated—and how, 18—the manner in which nature performs the operation of molting; 19—their molting season, 20—many live with fidelity together for a length of time—when one dies, the other shares the same fate soon after—the male of wild birds as happy in the young brood as the female, 23—nothing exceeds their patience while hatching, 26—Addison's observations to this purpose, 27—great care and industry in providing subsistence for their young—they feed each of the young in turn—and why—perceiving their nests or young to have been handled, they abandon the place by night, and provide a more secure, though less commodious retreat—the young taught the art to provide for their subsistence, 29—those hatched and sent out earliest in the season the most strong and vigorous—they endeavour to produce early in the spring, and why—efforts for a progeny when their nests are robbed, 30—such as would have laid but two or three eggs, if their eggs be stolen, will lay ten or twelve—the greatest number remain in the districts where they have been bred; and are excited to migration only by fear, climate, or hunger, 31—cause of the annual emigrations of birds, v. 32—times of migrations, 32, 35, 37—in what order performed, 35—follow the weather rather than the country, and go on as they perceive the atmosphere more suitable to their wants and dispositions, 36, 37—in all countries, longer-lived than quadrupedes or insects of the same climate, 39—surprizing age of swans and geese—plumage and voice of birds in different zones, 38—all less than quadrupedes—the greatest of one class surpass the greatest of the other in magnitude, 39—causes of the great variety in the middle order of birds—the ostrich is the greatest of birds—the humming-bird the smallest—wild birds generally of the same magnitude and shape, 40—inferior to quadrupedes in docility, 41—the number already known above eight hundred—difference between land-birds and water-fowls, 42, 43—description of birds of the rapacious kind—the pie kind, 44—the poultry kind—the sparrow

kind—the duck kind—the crane kind, 45—the cormorant the best fisher, vi. 68—the nauseous bird, or dodo, v. 77—powers of land-birds of the rapacious kind to obtain their food—fight of such as prey by day surprisingly quick—such as ravage by night have their fight fitted to see in darkness with precision, 80—inhabit the most lonely places and desert mountains—appearing in cultivated plains, or the warbling groves, is for depredation—every order of carnivorous birds seek for those of the size approaching their own, 81—the carnivorous kinds only breed annually, and are less fruitful than others—breed but few at a time, 82—where supplies of food are difficult, the old soon drive the brood from the nest to shift for themselves, and often destroy them in a fury caused by hunger—almost all birds of prey unsocial—the male and female when necessary to each other live together; but they most usually prowl alone, 83—birds with crooked beaks and talons are solitary—all males of prey are less, and weaker than the females—the females are of a greater size, more beautiful and lovely for shape and colours, stronger, more fierce and generous, than the males—it may be necessary to be thus superior, to provide for herself and her young—these birds are lean and meagre—their flesh is stringy and ill-tasted, soon corrupting, and flavoured of that animal upon which they subsist, 84—Belonius asserts, many people like the flesh of the vulture and falcon, and dress them for eating; and that the osprey, when young, is excellent food—five kinds of land-birds of a rapacious nature—whence their distinctive mark, 85—bird of heaven, name given by the ancients to the eagle, 90—the most formidable birds of prey respect the butcher-bird, 134—the digestion of such as live upon mice, lizards, or the like food, not very perfect, 214—father Kircher set the voice of birds to music, 143—domestic birds, of the poultry kind, maintained in our yards, are of foreign extraction, 151—the wilder species cooped or caged, pine away, grow gloomy, and some refuse all sustenance—the poultry kind alone grow fat, 154—climate, food, and captivity, three very powerful agents in the alterations in the habits, and the very form of birds—of all birds the cock the eldest companion of mankind, and the first reclaimed from the forest, 158—also the Persian bird of Aristophanes, v. 161—description of the tamis, or the bird of Numidia, 192—the bustard the largest land-bird, native of Britain, 194—none secures its young better from external injury than the toucan, 246—God's bird, the bird of pa-

radise, 260—the pigeon for its size has the largest crop, 288—parakeets the most beautiful in plumage, and the most talkative birds in nature, 281—small birds mark out a territory to themselves, which they permit none of their own species to remain in, 301—at some seasons of the year, all small birds migrate from one county to another, or from more inland provinces towards the shore—months of their migrations, 302, 303—Autumn the principal season for catching these wanderers—the nets, and the method of catching them—flur-birds, 304—singing among birds universally the prerogative of the male—small birds fight till one yields his life with the victory—two male birds strive in song, till the loudest silences the other; during the contention, the female sits an attentive silent auditor, and often rewards the loudest songster with her company during the season, 307—the male, while his mate is hatching, sits upon some neighbouring tree, to watch and to sing, 308—the nest of small birds warmer than of larger—small birds having finished their nests, nothing exceeds the cunning they employ to conceal it—worms and insects the first food of all birds of the sparrow kind, 309—how birds of the sparrow kind bring forth and hatch their young, 310—manner of life during the rigours of winter, 311—the male of small birds not finding a mate of his own species, flies to one of another like him, left out in pairing, 313—a mixed species between a goldfinch and a canary-bird, between a linnet and a lark; these breed frequently together, and produce not, like the mules among quadrupedes, a race incapable of breeding again, but one as fruitful as their parents, 312, 313—various birds of the sparrow kind, 314, 315—many plants propagated from the depositions of birds, 316—many of those kinds, which are of passage in England, permanent in other countries; and some with us constant residents, in other kingdoms have the nature of birds of passage—instances of it, 318, 319—the heron commits the greatest devastation in fresh waters, 394—the flamingo has the largest tongue, vi. 15—birds of various sorts and sizes, more than the stars in a serene night, seen in the rock of the Bass, and in the Firth of Forth, 70—none make a more indifferent figure upon land, or a more beautiful in the water, than the swan, vi. 111—of all birds known, it is the longest in the shell, 116—an incontestible proof that birds have their manners rather from nature than education, 124

Bird-catchers, sport by counterfeiting the cry of the owl, v. 146—Nets for, and method of taking small birds, 304

Biscayners, were in possession of the whale-fishery on the coasts of Greenland, in the beginning of the fourteenth century—their method of taking the whale, vi. 205, 206

Bison and *Urus*, names of descendants of one common stock, iii. 15—error of the naturalists upon this point—the cow and bison are animals of the same kind—description of the bison, 17—it is supposed by Klein and Buffon no more than another name for the bonafus, 18—the breed found in all the southern parts of the world, 20—the breed more expert and docile than ours—many bend their knees to take burdens up or set them down—the respect for them in India degenerated into adoration—it is nimble of foot—is esteemed by the Hottentots—assists them in attending their flocks and guarding them against invaders—is taught to combat the enemies of the nation, and every army of the Hottentots is furnished with a herd of them, 21, *et seq.*—they procure the Hottentots an easy victory before they strike a blow—lives in the same cottage with its master, and when it dies, a new one is chosen to succeed it by a council of the old men of the village, and is then joined with a veteran of its own kind, from whom it learns, becomes social and diligent, and is taken for life into friendship and protection—the bisons are found to differ from each other in several parts of the world—some have horns, some are without, 22—they are equally tractable and gentle when tamed, 23—and are furnished with a fine, lustrous, soft hair, more beautiful than that of our own breed—their hump of different sizes, weighing from forty to fifty pounds, more or less—cuts and tastes somewhat like a dressed udder—the bisons of Malabar, Abyssinia, Madagascar, Arabia, Africa, and America—in the course of a few generations, the hump wears away, 25, 24—its description—the bison and the cow breed among each other, 25, 26—the grunting or Siberian cow, and the little African cow or zebu are different races of the bison, 32

Bitch, a pregnant bitch, so placed by Mr. Buffon, that her puppies were brought forth in warm water, ii. 53

Bitch, one forgotten in a country-house lived forty days without any other nourishment than the wool of a quilt she had torn to pieces, iii. 304, 305

Bittern, or mire-drum, the solemnity of its evening-call cannot be described by words—they are calls to courtship or of connubial felicity—it differs from the heron chiefly in colour—its windpipe fitted for the sound—opinions concerning the cause of its boomings, vi. 2, 3—never utters its call in domestic captivity, 3—its residence—a retired timorous animal—its food, nest, and eggs, 4—in three days, leads its little ones to their food—differences between the bittern and the heron—its hollow boom considered by the vulgar as the preface of some sad event—instance of it—its flesh greatly esteemed among the luxurious, 4, 5—it seldom rises but when almost trod upon—at the latter end of autumn, in the evening, its wonted indolence forsakes it—is then seen rising in a spiral ascent, till quite lost from the view, making a singular noise different from its former boomings—names given to this bird by the Greeks and Latins, 5

Bivalve shells, vii. 12—all the kinds hermaphrodite, yet require no assistance towards impregnation, 41—particularly in these shell-fish the pearls are found, 53

Black-bird sometimes seen all over white—its eggs and nest, v. 321

Black-bird, of the sparrow kind, v. 314

Black-cap, bird of the sparrow kind, v. 317—prized by some for its singing, and is also called the mock nightingale, 335

Blacks, whence originally their flat noses, ii. 239—black parents have procreated two white Negroes, 240—conjectural opinion that the blacks are a race of people bred from one man accidentally black, 233—the climate a cause obvious and sufficient to produce blackness, 234—nothing satisfactory discovered upon the cause of producing it in human complexions—opinion of Sir Thomas Brown upon the subject, 235

Bladder, birds have no bladder for urine, v. 17—description of the air-bladder, and its use, in fishes, vi. 171, 175—some have no bladder, 174

Blennius or *Blenny* description of this fish, vi. 306—it brings forth two or three hundred at a time, all alive and playing round the parent, 177

Blind, such as live in countries generally covered with snow become blind, ii. 160—the mole not blind, iv. 92

Blind-worm, its description, vii. 221

Blood, arterial blood immediately mixed with air in the

lungs, is of a fine florid scarlet colour—that of the veins returning to the heart, is of a blackish crimson hue—whence this difference of colour proceeds not well understood, i. 332—the blood circulates through the bones, as through every other part of the body—Mr. Belcher the first who discovered it—his experiment to this purpose, ii. 194—the heat of the blood in man and other animals about thirty degrees above congelation—in the marmout, and other animals which sleep the winter, it is not above ten degrees, iv. 45—blood of the rein deer preserved in small casks for sauce with the marrow in spring, iii. 167

Blue-bird described, v. 321—its residence—is rarely caught—its docility—speaks and whistles at the word of command—manner of taking it, 322

Blue Cat, described, iii. 211, 212

Blushing, whence it proceeds, ii. 93

Wild Boar, varies not his colour as dogs of the domestic kind, iii. 172—description—he plows the ground like a furrow—his tusks seen almost a foot long—they differ from those of the elephant in that they never fall, 172, 173—when the boars come to a state of maturity, they dread no single creature—their position, when attacked—the manner of hunting them, 173, 174—when killed, the testicles cut off to prevent their tainting the flesh, 175—was formerly a native of our country—William the Conqueror punished with the loss of their eyes, such as killed it in his forests—at present the wild-breed is extinct, 180—the Canary boar described, 196—the tusks being broken away, the animal abates its fierceness and venery, and nearly the same effect as castration is produced, 197—does not fly at the approach of the lion—combat of a lion and a wild boar, in a meadow near Algiers, 226

Bobak, name of the marmout in Poland, iv. 48

Bodies, why some light bodies swim, and ponderous bodies sink, i. 189—the deeper a body sinks, the greater the resistance of the depressed fluid beneath—how then, after it is got a certain way, does it sink at all, 191—animal bodies left to putrefy, produce air copiously, 337—symmetry of the human body—the body of a well shaped man ought to be square, ii. 79, 80—human body often found to differ from itself in size, 110—instance of it, 108—the cause—differs also from itself in weight, 110—instances of it, 109—those parts fur-

nish
mati
upon
king
degr
min
dure
B
of h
i. 1
B
rica
this
B
the l
B
ii. 1
thro
acci
this
and
bone
bark
of th
fame
way
than
the r
ways
B
a var
Bo
Bo
tribe
Bo
Bo
Bo
man
Bo
seen
Bo
gran
of fif

nished with the greatest quantity of nerves, are first in formation, 146—the tone of a sonorous body made to depend upon the number of its vibrations, and not the force, is taking an effect for a cause, 164—suffering is but to a certain degree—torture becoming excessive, destroys itself; and the mind ceases to perceive, when the body can no longer endure, 207

Boerhaave taxed with marking out to his pupils a little ridge of hills in Holland, as mountains of no small consideration, i. 136

Boiguacu, the largest of the serpent kind in South America—sometimes forty feet in length, ii. 6—description of this creature, vii. 226

Bonafus, supposed by Klein and Buffon another name for the bison, iii. 18

Bones, in the embryo, almost as soft as the muscles and flesh, ii. 193—hard as the bones seem, the blood holds its current through them, as through other parts of the body—this was first accidentally discovered by Mr. Belcher—experiment made to this purpose, 194—in old age, more solid, also more brittle, and why, 195—bread of the Laplanders composed of the bones of fishes, pounded and mixed with the inside tender bark of the pine tree, 216—fossile bones found on the banks of the Ohio, in Peru, and Brasil, iv. 282, 283—fish of the same kind have the same number of bones, vi. 314—a vulgar way of speaking, that fishes are at some seasons more bony than at others—those small, lean, and with many fins are the most bony, 319—number of bones in spinous fishes always in proportion to the number and size of the fins, 314, 315

Bonet-Chinois, Mr. Buffon's name of a monkey, supposed a variety of that called malorouk, iv. 233

Bonito, description of this fish, vi. 310

Booby, name given by our seamen to birds of the penguin tribe, vi. 95

Borandians, description of them, ii. 213, 214

Berisfbenes, or Nieper, a river, its course and source, i. 210

Borneo, the natives hunt the ouran-outang in the same manner as the elephant or the lion, iv. 203

Barock, in the Kingdom of Cambaya, flocks of peacocks seen in the fields near that city, v. 175

Bosphorus, (the Thracian) was the first appropriated, by granting to such as were in possession of its shore the right of fishing in it, i. 232

Bottom of the sea in some parts not found, and why, i. 290—that of the Red Sea, a forest of submarine plants, 288—that of the sea near America covered with vegetables, 289—a map of the bottom of the sea between Africa and America, by M. Buache, 290

Bouro, island in the East Indies, where the babyrouessa, or Indian hog, is principally found—hog of the Bouro, the name given by travellers to the babyrouessa, iii. 192

Bowels, of the ruminating animals considered as an e. laboratory with vessels in it, iii. 3

Boyuna, of Ceylon, a kind of serpent, vii. 223

Brain and spinal marrow the first seen in the embryo, ii. 146—earth-worm entirely without it, viii. 168—some animals live without their brain for weeks, viii. 170

Brambling, bird of the sparrow kind, v. 315, 317

Bramins of India have a power of smelling equal to most creatures—they smell the water they drink, though to us quite inodorous, ii. 180

Brasi, black clothes worn there soon turn of an iron-colour—kept in the shops, preserve their proper hue, i. 314—the Brazilian rabbit, in shape like the English, has no tail—does not burrow—is not above twice the size of a dormouse, iv. 54—duck described, vi. 128

Bread, twelve ounces of it, and nothing but water, the common allowance, for four and twenty hours, among the primitive Christians of the East, ii. 132—that of the Laplanders composed of bones of fishes, pounded and mixed with the inside tender bark, of the pine tree, 216

Bream, description of the sea-bream, vi. 304

Breasts in women larger than in men—milk found in breasts of men as well as of women, ii. 102—black womens breasts, after bearing one child, hang down below the navel—it is customary among them to suckle the child at their backs, throwing the breast over the shoulder, 228

Breath of the lion is very offensive, iii. 224—manner of breathing in fishes, vi. 167

Breed, the Spartan or Molossian breed of dogs, iii. 295—Roger de Belegme, earl of Shrewsbury, the first who made attempts towards the mending our native breed of horses, ii. 370—Spaniards take all precautions to improve the breed of jackasses, 385

Breeze, from sea increases gradually till twelve, sinks away, and totally hushed at five—upon its ceasing, the land-breeze begins, increases till twelve at night, and is succeeded in the morning by the sea-breeze—cause of these two breezes—sometimes the sea and land breezes come at all hours—the land and sea-breezes on the coasts of Malabar and at Congo, i. 350, 351—constant breeze produced by the melting of snows, 347

Briffon, his method of classing animals, ii. 298

Bristol, a citizen of it who ruminated his food, iii. 6

Britons, the ancient, considered the hare as an unclean animal, and religiously abstained from it, iv. 14—the cock a forbidden food among them, v. 161

Broches, the horns of the stag the first year, iii. 113

Brock, the stag of the third year, iii. 113

Brown, (Sir Thomas) hoped one day to produce children by the same method as trees, ii. 26—his opinion upon the cause of blackness in human complexions, 235

Brun, (Le) giving a painter directions about the passions, places the principal expression of the face in the eye-brows, ii. 84

Brush, the name given by huntsmen to the tail of the fox, iii. 328

Brussels, in the Museum there, a creature covered with feathers and hair, said to be bred between a rabbit and a hen, iv. 15

Brutes, in those countries where men are most barbarous and stupid, brutes are most active, and sagacious, iv. 231

Buache (M.) gives a map of the bottom of the sea between Africa and America, i. 290

Bubalus, an animal partaking of the mixed natures of the cow, the goat, and the deer, iii. 79—its description—has often been called the Barbary cow, from which it differs widely, 80

Bubalus, properly a gazelle of Africa, iii. 149

Bubalus of the ancients, supposed of the cow kind by Buffon, placed among the lower class of ruminant quadrupeds, iii. 18

Buccinums, one or two of them viviparous, vii. 30

Buck, capable of propagating at the age of one year—one buck sufficient for an hundred and fifty goats—becomes old before his seventh year, iii. 55—hunting the buck and the stag performed in the same manner in England, 112—num-

ber of names invented by hunters for this animal—does not change his layer like the stag—manner of hunting him is much the same as that of stag-hunting, 128

Buck-goat produces with the ewe an animal that, in two or three generations, returns to the sheep, retaining no marks of his ancient progenitor, iii. 35

Buffalo, of the varieties of the cow kind, but two are really distinct, the cow and the buffalo—they bear an antipathy to each other, iii. 18—they do not breed among each other, and no animals are more distinct and like each other less, 26—are in abundance in Guinea and Malabar, 29—it is a great swimmer, 25—description of it, 27—the veal of the young is not better eating than the beef of the old—they are natives of the warmer climates, 28—yet are bred in several parts of Europe, particularly in Italy—the female produces one at a time, 29—continues pregnant for twelve months, 30—is afraid of fire—leather made of its hide is well known for thickness, softness, and impenetrability, 27—guided by a ring thrust through the nose—milk of the female not so good as of the cow—two buffaloes yoked draw more than four strong horses—its flesh hard and blackish, disagreeable to taste and smell—this animal wild in many parts of India, and dangerous, 28—manner of hunting them, 29—when tamed no animal more ptaient or humble—inferior in size only to the elephant the rhinoceros, or hippopotamos, 28—the camelopard, or camel, if taller, neither so long, nor so corpulent—is fond of the water, and crosses the largest rivers without difficulty, 29—has an aversion to red colours that resemble flame—in those countries where they are in plenty no person dresses in scarlet—they make most use of their feet in combat, and rather tread their enemies to death than gore them, 29, 30

Buffon, (M.) his theory of the earth, and a detail of, i. 33 to 38—questions that might be asked this most ingenious philosopher concerning his theory of the earth—he has brought together a multitude of facts relative to the history of the earth, 39—his systems about the rudiments of animals ii. 19—objections against it, 20—thinks that women never becomes bald, 86—his description of the first sensations of a man just brought into existence, pointing out the steps by which he arrived at reality, 187, 188

Buffoon-bird, name our sailors give the Numidian crane, v. 390—its peculiar gestures and contortions, 391—the French call it demoiselle, 390—it is a very scarce bird—the ancients

have described a buffoon-bird, but not meant the Numidian crane, 391

Bug, the May-bug. See *Beetles*

Bugs, their habits, vii. 281—described, 282—are often found coupling tail to tail, 284—manner of destroying them—they destroy fleas, and devour each other, 285

Bulbous, hair is so at the root, ii. 87

Bulin, a sea-snail, performs the offices of male and female at the same time, vii. 31

Bull, the gimero, asserted to be between the ass and the bull, ii. 386

Bulfinch, bird of the sparrow kind, v. 315, 317—may be taught to whistle a regular tune, 345

Bull-head, description of this fish, vi. 305

Bulls, the wild, in Spain mean despicable animals—have nothing of that sternness of aspect remarkable in our bulls, iii. 20

Bull's-eye, name given by sailors to a terrible hurricane—described, i. 359

Bunting, bird of the sparrow kind, v. 315

Burnet, his theory of the earth—a detail of that work, i. 22, 23

Bustard, the largest land-bird that is a native of Britain, v. 194—inhabits the open and extensive plain—is much larger than the turkey, the male generally weighing from twenty-five to twenty-seven pounds—its description—its food—places where frequently seen in flocks of fifty or more, 195—they have centinels always placed at proper eminences, ever on the watch, to warn the flock of the appearance of danger, v. 196

Bustards, are often run down by greyhounds—in what manner—seldom wander above twenty or thirty miles from home, v. 196—the males have a pouch, holding near seven quarts of water—they change their mates at the season of incubation, about the latter end of summer—separate in pairs, if there be a sufficiency of females for the males; otherwise the males fight until one of them falls—in France, some of those victims of gallantry found dead in the fields—their nests—they lay two eggs, almost of the size of a goose-egg—hatch for about five weeks—the young run about as soon as out of the shell, 197—they assemble in flocks in October, and keep together till April—their food in win-

ter—in parts of Swisserland, they are found frozen in the fields in severe weather—when taken to a warm place, they again recover—usually live fifteen years, and are incapable of being propagated in a domestic state, 198

Butcher-bird, its description, with its habits, v. 132—leads a life of continual combat—intrepidity of this little creature, in going to war with the pie, the crow, and the kestrel, all above four times bigger than itself—it fights upon the defensive, and often comes to the attack with advantage, particularly when the male and female unite to protect their young, and to drive away the more powerful birds of rapine—in what manner they fall forth against them, 133—sometimes the combat ends with the destruction of the assailant, and also of the defender, 134—the most redoubtable birds of prey respect them, and they fly in their company without fearing their power of avoiding their resentment—small birds are its usual food; and when it has killed the bird or insect, as asserted by the best authority, it fixes them upon some neighbouring thorn, and when this spitted, pulls them to pieces with its bill, 134—the smaller red butcher-bird migrates—the places where they are to be found, 135, 136—their nests, and the number of their eggs—the female feeds her young with caterpillars and other insects, but soon after accustoms them to flesh procured by the male with great industry—their nature very different from other birds of prey in their parental care; for instead of driving out their young from the nest to shift for themselves, they keep them with care, and even when adult do not forsake them—the whole brood thus live in a family together—each family afterwards live apart, and hunt in concert—upon the returning season of courtship, this union is at an end, the family parts for ever, each to establish a little household of his own, 135—the manner of flying is always up and down, seldom direct or sideways—different kinds of this bird, 136

Butter, the fat of the manati serves in all cases instead of butter, iv. 186

Butterfly, one of the principal ornaments of oriental poetry—in those countries, the insect is larger and more beautiful than with us, viii. 4—Mr. Reaumur found, that laying the aurelia in a warm room, he hastened the disclosure of the butterfly, and keeping it in an ice-house, he delayed it,

26—the efforts which it makes to get free from its aurelia state, are not so violent as those had in changing from the caterpillar into the aurelia, 27—how the butterfly gets rid of the aurelia, 28—easily distinguished from flies of every other kind by their wings—Linnaeus has reckoned up above seven hundred and sixty different kinds, yet the catalogue is incomplete, 32—number and beautiful colours of its wings, 33—butterflies can discover their mates at more than a mile's distance, 34—description of the head, corselet, and body, 35—the eyes have not all the same form; but the outward coat has a lustre, in which may be discovered all the colours of the rainbow—when examined closely, it has the appearance of a multiplying glass, 36—the use of their horns or feelers as yet unknown, 37—use of their trunks—difference between butterflies and moths, 38—they often perceive the approach of the female at above two miles distance; by what sense is not easy to conceive—it has no organs for smelling—the female is larger than the male, 39—if disturbed while united, the female flies off with the male on her back, entirely passive upon the occasion—after junction, they deposite their eggs and die—all females of this tribe are impregnated by the male by one aperture, and lay their eggs by another, 40—every butterfly chuses for her brood, instead of the plant most grateful in its winged state, that it has fed upon in its reptile form—how they keep their eggs warm, and also entirely concealed, 41—many do not lay till the winter warns them of their approaching end; some continue the whole winter in hollows of trees, and do not provide for posterity until the beginning of April, then leave their retreats, deposite their eggs, and die, 42—some kinds actually live upon nothing, ii. 125

Buttock, in man, different from that of all other animals, ii. 105

Buzzard, a sluggish inactive bird, often remains perched whole days upon the same bough—lives more upon frogs, mice, and insects, than upon birds more troublesome to seize—its manner of living in summer—so little capable of instruction, that it is a proverb to call one obstinately ignorant, a buzzard—the honey-buzzard, the moor-buzzard, and the hen-harrier, are of this stupid tribe, and differ chiefly in their size, v. 130

Byron (Commodore) our last voyager that has seen the gigantic race of mankind, ii. 261

C.

Cabiai, the same animal as the capibara, iii. 189

Cachalot, a fish said to pursue a shoal of herrings, and to swallow thousands at a gulp, vi. 166—it has generally gone under the name of the spermaceti whale, till Mr. Pennant made the distinction, borrowing its name from the French—seven distinctions in this tribe—description, 214—the throat of this animal very formidable—with ease it could swallow an ox—it can at one gulp send a shoal of fishes down its enormous gullet—it terrifies the dolphins and porpoises so much, as often to drive them on shore—it contains two precious drugs, spermaceti and ambergris, 214—the oil of this fish is easily convertible into spermaceti, by boiling it with a ley of pot-ash, and hardening it in the manner of soap—candles are now made of it, 216—the balls of ambergris not found in all fishes of this kind, but chiefly in the oldest and strongest, 217

Cagui, or the saki, is the largest monkey of the sagoi kind—its description, iv. 237

Cajeta, a mountain near it, was split by an earthquake, i. 157

Cauro, in what manner they produce there six or seven thousand chickens at a time, v. 168

Calabria and Sicily first taught the other kingdoms of Europe the manufacture of silk, viii. 50

Calao, the horned Indian raven, v. 235

Calcination, all animal substances when calcined are the same, vii. 3.

Calculations made by Kircher in taking the heights of places are incredible; and why, i. 154

Calf, name given to the young of the hind, or the female of the stag, iii. 108

Calf, or hind-calf; the stag called so the first year, iii. 113.

Callitrix, the green monkey of St. Jago, of the ancient continent—its description, iv. 234

Callyonymus, the dragonet—description of this fish, vi. 306

Calms attended with deluges of rain—why, and where, i. 345.

Camel a ruminating animal, iii. 5—camel and dromedary not two distinct kinds, only a variety of the same, which has subsisted time immemorial—the only sensible difference between those two races, they produce with each other, and the mixed breed is considered the best—of the two the dromedary is far the most numerous—countries where the camel and dromedary are found, iv. 302—neither can subsist, or propagate, in the climates towards the North—Arabia the most adapted to the support and production of this animal—the camel the most temperate of all animals—it can continue to travel several days without drinking, and is often six or seven days without any sustenance—its feet formed to travel upon sand, and utterly unfit for moist or marshy places, 303—many vain efforts tried to propagate the camel in Spain—they have been transported into America, but have multiplied in neither—they might perhaps produce in these countries, but would in a few years degenerate; their strength and their patience would forsake them; and instead of enriching, become a burthen to their keepers, 304—uses to which this animal is put among the Arabians, 304, 305—its education, 306—it has a fifth stomach, as a reservoir, to hold a greater quantity of water than immediately wanted—when the camel finds itself pressed with thirst, it throws up a quantity of this water by a simple contraction of the muscles, into the other stomachs—travellers, when straitened for water, have often killed their camels for what they expected to find within them—countries where commerce is carried on by means of camels, 307—trading journies in caravans—their food, 308—pursue their way when the guides are utterly astray—its patience and docility when loaded, 309—in what manner the female receives the male—one male left to wait on ten females, the rest castrated—they live from forty to fifty years, 310—every part of this animal converted to some useful purpose—its very excrements are not useless, 311—their burthen, 308

Camel, the lama considered as the camel of the new world, iv. 312.

Camelion, its dimensions and appetites, vii. 151—has a power of driving the air it breathes over every part of the body, 152—changes of its colour, 153—it is an error that it assumes the colour of the object it approaches, 154—dū-

scription of it by Le Bruyn—it often moves one eye, when the other is at rest—sometimes one eye seems to look directly forward, while the other looks backward; and one looks upward, while the other regards the earth, 154, 155, 156

Camelopard described, iv. 298—dimensions of a young one, 299—inhabits the deserts of Africa, 298—no animal from its disposition, or its formation, less fitted for a state of natural hostility, 299, 300—it lives entirely upon vegetables, and when grazing, spreads its fore legs wide to reach the pasture—known to the ancients, but rarely seen in Europe—often seen tame at Grand Cairo, in Egypt—Pompey exhibited at one time ten upon the theatre, 300

Camerarius, his description of the perfections a horse ought to possess, ii. 372

Camlet made of the hair of animals about Angora, iii. 58

Canada, above thirty thousand martins skins annually imported from that country into England, iii. 372

Canals, for the circulation of blood through the bones, are of different capacities, during the different stages of life, ii. 194, 195—canal of communication through which the blood circulates in the foetus, without going through the lungs, found open in some bodies when dissected, vii. 58

Canary-bird, by the name, originally from the Canary Islands—comes to us from Germany, where they are bred in numbers—at what period brought into Europe is not known—about a century ago they were sold at very high prices, and kept only for the amusement of the great—in its native islands it is of a dusky grey colour, and so different from those seen in Europe, as to raise a doubt about its species, v. 339—rules and instructions for breeding them in a domestic state, 340, 341—apparatus for breeding in Germany, v. 342—food the old ones must be supplied with, when the young ones are excluded—so prolific are these birds sometimes, that the female will be ready to hatch a second brood before the first is able to quit the nest, 343—this bird kept in company with the linnet or gold-finch, pairs and produces a mixed breed, most like the canary-bird, and resembling it in its song, 344—taught to pick up the letters of the alphabet at the word of command, to spell any person's name in company, 41

Canary boar described, iii. 196

Cancerous breasts cured by the sucking of the rubeth, or the land-toad, vii. 102

Candle quickly extinguishes in an exhausted receiver, and why, i. 333

Cannons, filled with water, and left to freeze, burst, i. 179

Cantharides, well known in the shops by the name of Spanish flies, and for their use in blisters—their description, with the differences from each other, viii. 141—the countries where, and trees on which they are seen—it is reported, that the country people expect the return of these insects every seven years—their bad smell is a guide for those who catch them—they smell so disagreeable, as to be perceived at a great distance, especially about sun-set, though not seen at the time, 142—they yield a deal of volatile caustic salt—their qualities—the effects fall principally upon the urinary passages—in what manner they are killed, 143

Cape de Verde islands—a south-wind prevails in them during the month of July, i. 345

Cape of Good Hope, a north-west wind blows there during the month of September, i. 346—at the Cape of Good Hope, it is customary to hunt the elephant for its teeth, iv. 280—in what manner—account of an unhappy huntsman. 281

Capibara, or cabial, an animal resembling an hog of about two years old, iii. 190—its description—some naturalists have called it the water-hog; and why, 191—a native of South America, and chiefly frequenting the borders of lakes and rivers—like the otter it seizes the fish, upon which it preys, with its hoofs and teeth—lives also upon fruits, corn, and sugar-canes—its cry resembles the braying of an ass, more than the grunting of an hog—its only place of safety is the water, into which it plunges, when pursued; and keeps so long at the bottom, that the hunter can have no hopes of taking it there, 192—when young is easily tamed—its flesh has a fishy taste, but its head is said to be excellent, 192

Capons taught to clutch a fresh brood of chickens throughout the year, v. 169

Capon of Pharaoh supposed the true ibis—is a devourer of serpents, and follows the caravans that go to Mecca, to feed upon the offal of the animals killed on the journey, v. 385

Caracal, or the siagush, a native of the East Indies, resembles the lynx in size, iii. 258

Caracol, a town situated at the foot of the Andes, i. 147

Caraguata, a plant in the West Indies, which clings round the tree it happens to be near—it keeps away that nourishment designed to feed the trunk, and at last entirely destroys its supporter, ii. 4

Carapo, description of this fish, vi. 311

Carassa, a volcano in South America, i. 99.

Caravan, a single lion of the desert often attacks an entire caravan, iii. 216—the assemblage called a caravan sometimes composed of numbers amounting to ten thousand, iv. 308

Carcojou, name given by the North Americans to the glut-ton—its manner of killing the rein-deer, iii. 170

Caribou, name the Americans give the rein-deer, iii. 153

Carli (Father) his account of the faithful services of monks in Angola, where he went to convert the savage natives to Christianity, iv. 231

Carnivorous animals seek their food in gloomy solitude, iii. 1—they are sharper than the ruminating animals, and why—their stomachs small, and their intestines short, 2—their intestines thin and lean, 4—except the dog, none will make a voluntary attack, but with the odds on their side, ii. 319—in proportion as each wants strength, it uses the assistance of patience, assiduity, and cunning, 320—there is one class that pursue in a pack, and encourage each other by their mutual cries, 322—support a state of famine for several weeks together, 323—milk in those animals is more sparing than in others, iii. 337

Carnivorous birds seek for such as are of the size most approaching their own, v. 81. See *Birds*.

Carp, an experiment made with this fish in a large vase of water, under an air pump, vi. 168 one found by Buffon not less than a hundred years old—this discovery confirmed by other authors, 175—continues in the egg not above three weeks, 179—Mr. Tull famous for his invention of spaying carp to give it a fine flavour, vi. 180—its description, 308—the method of fattening it in a damp cellar—it has been known thus to live for a fortnight to grow exceedingly fat, and to get a superior flavour, 312

Carriers, pigeons used to carry letters, v. 292

Carrión-crow resembles the raven in its appetites, its laying, and manner of bringing up its young, v. 230

Cartesius, his theory to explain the invariable motion of the winds, not quite so absurd as that of doctor Lyfter, i. 342

Cartbagena, in America—the heat of its climate affects the speech of its inhabitants, which is soft and slow, and their words generally broken—more than three parts of our army destroyed by the climate, in our unsuccessful attack upon it, i. 322

Cartbamus or bastard saffron, strongly purgative to man, v. 281—parrots very fond of it, v. 280

Cartilage, the thyroid cartilage, ii. 102—cartilages in youth elastic and pliant in age, become at last hard and bony; and why, 195

Cartilaginous fishes—their general conformation—supposed they grow larger every day till they die, vi. 227—their internal structure—are possessed of a twofold power of breathing—apertures by which they breathe, 228—the cartilaginous shark, or ray, live some hours after they are taken—fishes of this tribe can remain under water, without taking breath; and can venture their heads above the deep, and continue for hours out of their native element 229—their season and manner of copulating—and of bringing forth, 230—little difference between the viviparous, and the oviparous kinds, in this class of fishes 231—five divisions of the cartilaginous fish, 231

Cassowary, a bird first brought into Europe by the Dutch from Java, in the East Indies, where only it is found—its description, v. 68, 69—the part which most distinguishes this animal is the head, which inspires some degree of terror, 70—its internal parts described—it has the head of a warrior, the eye of a lion, the defence of a porcupine, and the swiftness of a courser, 72—is not fierce in its natural character—how it defends itself—extraordinary manner of going—the Dutch assert that it can devour glass, iron, and stones, and even live and burning coals, without the smallest fear, or the least injury, 73—the largest of its eggs is fifteen inches round one way, and twelve the other—places where this animal is found—it has not multiplied in any considerable degree, as a king of Java made a present of one to the captain of a Dutch ship, as a rarity, 74

Catacombs of Egypt, ii. 277

Catamountain, or the Ocelot of Mr. Buffon, iii. 255—its description, 356—it hunts for the hare, or the rabbit, ii. 320—is one of the fiercest, and for its size, one of the most destructive animals in the world, iii. 262

Cats, the wild hunt for the squirrel or the mouse, ii. 320

Catanea, a city utterly overthrown by an earthquake, i. 111, 112

Catapbractus, or kabassou, is one of the largest kinds of the armadilla, iv. 133

Cataracts of the Rhine, and of the Nile, i. 221—the cataract of the river Velino, in Italy, is above an hundred and fifty feet perpendicular—a cataract near the city of Gottenburg in Sweden—other cataracts, 222

Cataract of the eye, Mr. Cheselden having couched a boy of thirteen, who to that time had been blind, and at once having restored him to sight, curiously marked the progress of his mind upon the occasion, ii. 152

Caterpillars, their differences from all other insects, viii. 4, *et seq.*—all these animals are hatched from the eggs of butterflies—during winter, the greatest number of caterpillars are in an egg state, 7—in the aurelia state, they are seemingly deprived of life and motion, 8—some do not make any change at the approach of winter, but chuse themselves some retreat, and there remain quite motionless, and as insensible as if actually dead—caterpillars of this kind are found in great numbers together, enclosed in one common web that covers them all—there are some of the kind, whose butterflies live all the winter; and where, 9—a single caterpillar eats double its own weight of leaves in a day, and seems no way disordered by the meal, 10—the body of the caterpillar anatomically considered 11—avidity with which they feed 12—number of their stigmata, or those holes through which the animal is supposed to breathe, 13—it has eighteen lungs—the experiment of Malphigi to ascertain their use, 14—all caterpillars spin at one time or another, 15—many of them change their skins five or six times in a season, 16—and in what manner, 17—change into an aurelia, 19—their retreats in that state, 22, 23—there are thousands of fishes, birds, and insects, that live chiefly upon caterpillars, 43—a single sparrow and its mate, that have young ones, destroy above three thousand caterpillars in a week—some of the kind, fitted only to live upon leaves and plants, will

eat each other, in preference to their vegetable food, 44—the bodies of the larger kinds serve as a nest to various flies, that very carefully deposit their eggs in them, 46—number of worms remain within the body of the caterpillar, devouring its entrails, without destroying its life, 47—the inchneumon tribe is not the caterpillar's offspring, as supposed, but its murderers, 48

Cat-fish, its description, vi. 300

Cats, the whole tribe seek their food alone and never unite for mutual defence, nor for mutual support—and, except at certain seasons, are enemies to each other—all of the cat kind devour nothing but flesh, and starve upon any other provision, iii. 198—their greatest force lies in the claws, 200—the cat goes with young fifty-six days; and seldom brings forth above five or six at a time—the male often devours the kittens—before they are a year old, they are fit to engender, 203—the female seeks the male with cries; nor is their copulation performed without great pain; and why—cats hunt the serpents in the isle of Cyprus—any animal weaker than themselves, is to them an indiscriminate object of destruction—the mouse is their favourite game, and they patiently watch a whole day, until the mouse appears, 204—a flagrant mark by which the cat discovers its natural malignity—their eyes see better in darkness than light; and why—if the inhabitant quits the house, the cat still remains, 205—is excessively fond of some plants, such as valerian, marum, and cat mint—particularly loves fish, 206—its sleep is very light—its hair sends forth shining sparks, if rubbed in the dark—the wild breed with the tame—description of the wild cat, 207—inhabits the most mountainous and woody parts, lives mostly in trees, and feeds only by night—the cat was much higher in esteem among our ancestors than it is at present, 208—laws of Howel, concerning the price of cats—cats were not naturally bred in our forests—of all quadrupeds, the wild cat is, perhaps, that whose intestines are proportionably the smallest and the shortest; and why, 208—common to the new continent, as well as the old—the blue-cat, 211 the lion-cat, or more properly, the cat of Angora—the cats in Syria and Persia remarkable for their long, soft hair, 212—all the cat kind are kept off by the fires which the inhabitants light to preserve their herds and flocks—and they hunt rather by the sight than the smell, 222—it happens that the

lion pursues the jackall or the wild dog, while they are hunting upon the scent, and merely for themselves; the lion is then an unwelcome intruder upon the fruits of their toil—from thence, probably, has arisen the story of the lion's provider, 223—the lion devours a great deal at a time, and generally fills himself for two or three days to come—in the deserts and forests, his most usual prey are the gazelles, and the monkeys, 223—the race of cats noxious in proportion to their power to do mischief—inhabit the most torrid latitudes of India, Africa, and America, and have never been able to multiply beyond the torrid zone; they seldom attack man, though provoked—of all animals these are the most fullen, and, to a proverb, untameable, 259—different classes of the kind from the lion to the cat, 267—the wild cat and the martin seldom meet without a combat—it is not a match for the martin, 369—the cat of Pharaoh injudiciously called the ichneumon, 376—cats of Constantinople, a name of the gennet, and why, 388

Cattle, we have the best breed of horned cattle in Europe, iii. 12—the large hornless bred in some parts of England, originally from Poland, 13—the Dutch bring great quantities of lean cattle from Denmark, to fatten on their own rich grounds—that of Ukraine becomes fat, and is considered the largest breed of all Europe—in Switzerland these animals grow to a large size—not so in France, iii. 19—size in Barbary, Ethiopia, Persia, and Tartary, iii. 20—leather-mouthed cattle, 45—liable to be destroyed by the South-American bat, vampyre, iv. 146

Caverns, the amazing cavern of Eldenhole in Derbyshire, i. 60—the dreadful cavern in the country of the Arabian Indians, called the Gulph of Pluto, described by Ælian, 61—cavern of Mæstricht, 63—its description, 64—no part of the world has a greater number of artificial caverns than Spain, 64—in general deserted by every race of meaner animals, except the bat—the caverns called Oakley-hole, the Devil's-hole, and Penpark-hole in England, 65—the cavern of Antiparos, and its discovery, 67—how natural caverns formed, 72—two hundred feet as much as the lowest of them is found to sink, 73—one in Africa, near Fez, continually sends forth smoke or flames, 99

Caviar, the inhabitants of Norway prepare from eggs found in the body of the porpess, a savoury liquor, which

makes a delicate sauce, and is good when eaten with bread, vi. 224—it is made with the roe of sturgeon—more in request in other countries of Europe than with us—and is a considerable merchandize among the Turks, Greeks, and Venetians—manner of making it, 277

Causes, the investigation of final causes a barren study: and, like a virgin dedicated to the deity, brings forth nothing, i. 20

Caustic, cantharides yield a great deal of volatile caustic salt, viii. 143

Cayman, a sort of crocodile, vii. 119

Cayopolis, a kind of oppossum—its description, iv. 248

Cea, an island washed away with several thousand inhabitants, i. 134

Cells, made by the bees, viii. 70, 71

Centre, a mount of recent appearance, i. 162

Centinel, some animals carefully avoid their enemies, by placing centinels to warn of danger, and know how to punish such as neglect their post, or are unmindful of the common safety, ii. 324—when the marmouts venture abroad, one is placed as a sentry, upon a lofty rock, iv. 43—the bustards have centinels placed upon proper eminencies, where always on the watch, they warn the flock of the smallest appearance of danger, v. 196

Centipes, the scolopendra, vii. 302

Centriscus, a kind of cartilaginous fish, vi. 291

Cephus, name given by the ancients to the monkey now called mona, iv. 234

Cepola, the description of this fish, vi. 301

Cerigo, an island of the Archipelago, where many wild asses are found, ii. 377

Cetaceous fishes, the whale and its varieties resemble quadrupeds in their internal structure, and in some of their appetites and affections, vi. 182—they are constrained every two or three minutes to come up to the surface to take breath, as well as to spout out through their nostril, for they have but one, that water which they sucked in while gaping for their prey, 183—the senses of these animals superior to those of other fishes, and it is most likely that all animals of the kind can hear, 184—they never produce above one young, or two at the most; and this the female suckles in the manner of quadrupeds, her breasts being placed, as in the human kind, above the navel—distinctive marks of this tribe, 185, 186, 187

Chace, men of every age and nation have made that of the stag a favourite pursuit—in our country it was ever esteemed a principal diversion of the great, iii. 109—the same in Sicily, 120—and in China, 121—terms used by hunters in that chace, 113, 114—chace of the fox—cant terms used by the huntsmen in it, 328—these sports reserved by sovereigns for particular amusement, and when, 109—in the reigns of William Rufus and Henry the First, it was less criminal to destroy a human being than a beast of chace—sacred edifices thrown down for room to beasts of chace, 110—chace of the stag, as performed in England, 112, 116 of all varieties, that of the ostrich the most laborious, is also the most entertaining—description of it, v. 59, 60

Chacrelas, white men go by that name in the East Indies, ii. 241

Chatodon, or the *cat-fish*, its description, vi. 302

Chaffinch, a bird of the sparrow kind, v. 315, 317, 318—time of emigration of the hen, 32

Chapotonadas, a distemper in America, i. 323

Charles XII. when shot at the siege of Frederickshall, was seen to clap his hand on the hilt of his sword, ii. 208

Charoffi, the only sort of horses for hunting lions, iii. 226

Charybdis, a gulph, Nicola Pesce jumped into it, continued for three quarters of an hour below, and at last appeared holding a golden cup in one hand, and making his way among the waves with the other, i. 296—description of this gulph, 297

Chasms, amazing in the Alps, i. 59—and still more in the Andes, 60—causes that produce chasms or fissures, 62

Chatterer, a bird native of Germany—its description, v. 242

Cheese, the inhabitants of Canada use no other than the milk of the hind, or the female of the stag, iii. 124—those of Lapland little and well tasted, 156—never breed mites, 166

Cheops, the oldest measure of the human figure in his monument, in the first pyramid of Egypt, ii. 264

Chefelden, after couching a boy of thirteen for a cataract, blind from his infancy, and at once restoring him to sight, curiously marked the progress of his mind upon the occasion, ii. 152 to 156

Chevrotin, or little *Guinea deer*, the least of cloven footed

quadrupeds, and perhaps the most beautiful—is most delicately shaped—its description—native of India, Guinea, and the warm climates between the tropics, iii. 82—the male in Guinea has horns; but the female is without any—they chiefly abound in Java and Ceylon, 83

Cbeysne, suspected the quantity of water on the earth daily decreasing, i. 182

Chicken, an amazing history of it in the egg, by Malpighi and Haller, ii. 30, *et seq.*—in what manner six or seven thousand are produced at a time, at Grand Cairo, v. 168—capon clutches a fresh brood of chickens throughout the year, 169

Child history of the child in the womb, ii. 39 to 47—as the child increases in age, the inferior parts proportionably lengthen, 108—a child marked with a scar, similar to one the father had received in battle, 238—Sir Thomas Brown hoped to become able to produce children by the same method as trees, 26—children of negroes able to walk at two months old; at least to move from one place to another—skin of children newly brought forth, is always red, and why—the size of a new-born infant about twenty inches, and its weight twelve pounds, 56—in cold countries continue to be suckled for four or five years together, 59—child's growth less every year, till the time of puberty when it seems to start up of a sudden, ii. 61—in some countries speak sooner than in others, and why, 64—children of the Italians speak sooner than those of the Germans—various methods pointed out to improve the intellects of children, 64, *et seq.*—white children frequently produced from black parents; but never black children from two whites, 240—inherit the accidental deformities of their parents—instances of it, 238—many instances of the child in the womb being marked by the strong affections of the mother—how performed is not known, 249—hard to conceive that the child, in the womb, should take the print of the father's features, 248

Chimborazo, a remarkable mountain in South America, i.

151

Chinese, have neither flats nor sharps in their music, ii. 166—their horses weak, little, ill-shaped, and cowardly, 364—description of that people, 221

Chorosan, in Persia, bodies previously embalmed and buried in the sands of that country, preserved from corruption for a thousand years, ii. 277

Chough, description of the Cornish chough, v. 231

St. Christopher, Dr. Grainger, who resided for many years there, affirmed, that of the same kind of fish caught at one end of the island, some were the best and most wholesome in the world; while others taken at a different end, were dangerous, and commonly fatal, vi. 345

Chrysalis, or the *aurilia*, viii. 19

Chryses, an island sunk near Lemnos, i. 134

Cicero, a long poem of his in praise of the halcyon, of which but two lines remain, vi. 141

Circassians, described, ii. 230

Circe, an enchantress, armed her son with a spear headed with the spine of the trygon, vi. 256

Circulation of the blood through the bones, first accidentally discovered by Mr. Belcher—experiment made by him for this purpose—canals for circulation of the blood through the bones of different capacities, in the various stages of life, ii. 194—circulation through all parts of the body, 195

Civet, the species distinguished into two kinds; Mr. Buffon calls one the civet, the other the zibet—distinctions between the two kinds—the civet thirty inches long—both civet and zibet considered as varieties of the same animal, as former naturalists have done, iii. 389—the civet resembles the weasel kind, in what—differs from them, in what—the opening of the pouch or bag, the receptacle of the civet, 389, 390—manner of taking the civet from the pouch—although a native of warmest climates, this animal lives in temperate, and even cold countries, 391—kinds of food it likes best—drinks rarely, yet it makes urine often; and, upon such occasions, the male is not distinguishable from the female—numbers of these animals bred in Holland, and the perfume of Amsterdam reckoned the purest of any—the quantity greater, proportionably to the quality and abundance of the food—this perfume so strong that it communicates to all parts of the animal's body, 392—to its fur and skin—manner of chusing the perfume—the places of considerable traffic in it—the animal irritated, its scent becomes greater; and tormented, its sweat is still stronger, and serves to adulterate or increase what otherwise obtained from it—civet a more grateful perfume than musk—sold in Holland for fifty shillings an ounce, 393—its eyes shine in the night—sees better in the dark than by day—breeds very fast in climates where

heat
never
it can
quite
Ch
Buffo
Ch
to its
neith
—tho
Ch
cold,
nests
dark
next
upon
sively
fowls
Ch
ming
Ch
price
i. 32
Ch
failor
produ
cloud
369—
down
imag
Ch
Co
Co
Co
kind
comp
348,
Gulp
Co
very
Co
Co

heat conduces to propagation—thought a wild fierce animal, never thoroughly familiar—lives by prey, birds and animals it can overcome—its claws feeble and inflexible—this perfume quite discontinued in prescription, 394

Clavicles, or collar bones, what animals have them—Mr. Buffon says, none but monkeys, this an over-sight, ii. 102

Claws of the lion give a false idea of its power; we ascribe to its force the effects of its arms, ii. 111—the weasel kind neither draw in, nor extend their claws, as cats do, iii. 346—those of the civet, feeble and inflexible, 394

Climates, calamities in those where the air is condensed by cold, i. 325—cause obvious and sufficient to produce blackness of negroes, ii. 234—complexions of different countries darken in proportion to the heat of the region, 233, 234—next to human influence, the climate has the strongest effects upon the nature and form of quadrupeds, 328—those excessively hot, unfavourable to horses, 363—in general, waterfowls of no peculiar climate, vi. 104

Cloth, now made worse than some years past, iii. 44—Flemings possessed the art of cloth-working in a superior degree, 43

Clove-trees, cut down by the Dutch at Ternate to raise the price of the spice—soon had reason to repent of their avarice, i. 325

Clouds, the forerunners of a terrible hurricane, called by sailors the bull's eye, i. 359—dashing against each other, produce electrical fire—water evaporates, and rising, forms clouds, 368—the theory upon it—that of Dr. Hamilton, i. 369—the author's theory of evaporation, 370—at once pour down their contents, and produce a deluge—reflecting back images of things on earth, like mirrors, 377

Clupea, or *herring*, its description, vi. 308

Coati, a monkey of the new continent, described, iv. 236

Coan, the name of a dwarf lately dead at Chelsea, ii. 254

Coast of Italy is bordered with rocks of marble of different kinds—those of France from Brest to Bourdeaux, and Spain, composed of rocks, i. 271—of the sea, have peculiar winds, 348, *et seq.*—deadly winds all along those of the Persian Gulph, and those of India, 359

Coatimondi, extreme length of its snout—its description—very subject to eat his own tail—its habits, iv. 336, 337

Cobitis, the loach, description of this fish, vi. 308

Cobra di Capello, a kind of serpent, vii. 192, 201, 216

Cochineal, description of this insect as in our shops brought from America, viii. 145—difference between the domestic and wild cochineal—precautions used by those who take care of these insects, 145. 146—the propagator has a new harvest thrice a year—various methods of killing them—produce different colours as brought to us—our cochineal is only the females—used both for dyeing and medicine, 147

Cock, of all birds the cock the oldest companion of man, and first reclaimed from the forest, v. 158—species of cock from Japan, covered over with hair instead of feathers—the western world had the cock from Persia—Aristophanes's cock the Persian bird—it was one of the forbidden foods among the ancient Britons—Persia, that first introduced it to us, no longer knows it in natural form, 161—countries where it is wild—peculiarities, in a wild condition—another peculiarity in those of the Indian woods, their bones, when boiled, are black as ebony, 162—the Athenians had cock-matches as we—no animal of greater courage, when opposed to one of his own species—in China, India, the Philippine islands, and over the East, cock-fighting the sport and amusement of kings and princes—cocks in China as bold, or bolder than ours, 163—and of more strength with less weight—its great courage proceeds from being the most fallacious of all birds—a single cock suffices for a dozen hens; and is the only animal whose spirits are not abated by indulgence—soon grows old; and in three or four years becomes unfit for the purposes of impregnation, 164. 165—how long cocks live, left to themselves, not well ascertained—Aldrovandus makes their age to be ten years—are injured, as Linnæus asserts, by elder-berries, 170—the black chiefly found in heathy mountains and piny forests, 199—cock of the wood, see *wood-cock*.

Cockle, a bivalved shell-fish, vii. 51

Cocoa, the elephant eats the plant to the roots, iv. 259

Cod, from the banks of Newfoundland, pursues the whiting, which flies before it to the southern shores of Spain, vi. 165—spawns in one season, as Lewenhoeck asserts, have nine millions of eggs or peas, contained in a single roe, 173—its description, 308—fishery in Newfoundland, 321

Cold, promotes evaporation, although diminishing the force of menstrua, i. 370—extremity of it not less productive of tawny complexions than that of heat, ii. 236—excessive, preserves bodies from corruption, 275—some

fishes rendered so torpid by cold, in northern rivers, as to be frozen up in the masses of ice, where they continue for months together, without life or sensation, prisoners of congelation, waiting a warmer sun to restore them to life and liberty, vi. 341

Collar-bones, what animals have them, ii. 102

Colliers, eight dropped down dead by the vapour of the mines in Scotland, as if shot, i. 81

Colour, none refreshes the sight so well as green, i. 15—of the sea, not from any thing floating in it, but from different reflexions of rays of light—the proof, 292—different colours of the eye, ii. 82—whence proceeds the tawny of North American Indians, 236—different of the waters of the same sea, i. 274—hair takes its colour from juices flowing through it, ii. 87—that of the object contributes to form an idea of the distance at which it appears, 156—of all those by which mankind is diversified, ours most beautiful to the eye, and most advantageous, 232—those changes the African, the Asiatic, or the American undergo, in their colour, are but accidental deformities, which might probably be removed, 242—nothing exceeds the delicate regularity of those of the zebra, 390—change of colour in the hair obtains in some degree, in all quadrupedes, iii. 354—different in several parts of the fur of the sable, 374—of the blood in the arteries or veins, i. 332

Comets, their number much greater than that of the planets—they roll in orbits—experience has not sufficiently confirmed the truth of the investigation about their returning periods, i. 5

Complexion, extremity of cold not less productive of a tawny than that of heat, ii. 236—not easy to conceive how the sun whitens wax and linen, and darkens the human complexion, 235—the sun not the only cause of darkening it, 236

Compe's (Le) account of an ape he saw in the straits of Molucca, iv. 198

Concretions, scarce an animal, or a part of their bodies, in which concretions are not formed, iii. 77—experience has found but few cures by the efficacy of these concretions; often prove fatal to the animal that bears them, 76, 77

Condamine, (La) knows a fish possessed of the powers of the torpedo, and every way resembling a lamprey, vi. 269

Condema, anomalous animal of the goat kind, iii. 80—its description, iii. 80, 81

Condor, possesses in a higher degree than the eagle, all the qualities that render it formidable to the feathered kind, to beasts, and to man himself—is eighteen feet across the wings extended, according to Acosta, Jarcilasso, and Desmarchais, v. 100—the beak so strong as to pierce the body of a cow; two of them able to devour it—they do not abstain from man himself—fortunately there are few of the species—the Indians believe that they will carry off a deer, or a young calf in their talons, as eagles would an hare or a rabbit—and that their sight is piercing, and their air terrible; that they seldom frequent the forests, as they require a large space for the display of their wings—they come down to the sea-shore at certain seasons, when their prey fails upon land, they then feed upon dead fish, and such nutritious substances as are thrown upon the shore—their countenance not so terrible as old writers have represented, 101—those who have seen this animal, say the body is as large as that of a sheep—many instances of its carrying away children, 102—circumstantial account of this bird by P. Feuillée, the only traveller who has accurately described it, 102 to 104—countries where it is found, 105—in the deserts of Pachomac, where it is chiefly, men seldom venture to travel—its flesh as disagreeable as carrion, 102

Conspate, an animal resembling the skink in all things except size, iii. 381

Congar of America, resembles the tiger in natural ferocity, though far inferior in its dimensions, iv. 331

Congelation, the heat of blood in man and other animals is about thirty degrees above congelation; but in the marmout and other animals which seem to sleep the winter, the heat of the blood is not above ten degrees above congelation, iv.

45
Congo, the land and sea breezes there, i. 351—the inhabitants of that country desire ardently to prostitute their wives and daughters to strangers for trifling advantages, ii. 74

Constantinople, its cats—name given to the genetts, and why, iii. 338

Continents of America—that part under the line is cool and pleasant, ii. 233

Coar, description of that bird, vi. 36—residence and nest, 38

sometimes swims down the current, till it reaches the sea—
dangers encountered in this voyage, 39

Copel, manner of making that vessel, i. 166

Copulation, natural instinct for the proper times—instances
of it, ii. 337, 338—gnats produce young, without copulation,
viii. 156

Coquallin, the Brazilian squirrel, so called by Buffon, iv. 26

Coral, the common red never met with in the fossil world,
i. 46

Coral-serpent described, vii. 215

Coral-plants, their various appearances, viii. 193—opinion
of count Marfigli upon corals—Mr. Ellis proves it the work
of reptiles of the polypus kind, 194—principal experiment
to this purpose, 196

Coralines, called *sungi madreporas*, viii. 197

Cordyle, the tockay and the tejuguacu fill up the chasm
between the crocodile and the African iguana, vii. 149

Coret, a sea-snail, performs the offices of male and female
at the same time, vii. 31

Coriander, used in dressing a hare in the true Roman taste,
iv. 15

Corin, name of the third variety of gazelles, by Mr. Buf-
fon, iii. 73

Cormorant, its description and food—remarkably voracious
with a sudden digestion, vi. 64—its form disagreeable—its
voice hoarse and croaking—all its qualities obscene—no won-
der Milton makes Satan personate this bird—objection against
this passage of Milton's *Paradise Lost*, vindicated—fishes in
fresh waters, and in the depths of the ocean, 65—builds in
cliffs of rocks, and in trees—preys in the day-time, and by
night—once used in England for fishing, and in what man-
ner, 66—how educated in China, for the purposes of fishing,
67—the best fisher of all birds, 68—sometimes has caught
the fish by the tail—the fins prevent its being swallowed in
that position—how it manages the fish in this case, 69—re-
marked for the quickness of its sight, 73

Corn, the flying squirrel is apt to do a great deal of damage
in the corn fields, iv. 37

Cornaro, lived an hundred years with a constitution natu-
rally feeble, ii. 205

Cornea of a flea has above six thousand facets, according
to Leuwenhoeck—Puget adapted the cornea of a flea in a

position, to see objects through it with a microscope, and a soldier thus seen appeared like an army of pigmies—the arch of a bridge was a spectacle more magnificent than human skill could perform—the flame of a candle seemed a beautiful illumination, viii. 36

Cornwall, pilchards make that coast a place of resort, vi. 326

Coromandel, dreadful tempests wholly unknown along its coasts, i. 348—amazing size of oysters along that coast, vii. 51

Corrira, or the runner, a bird of the crane kind—its description, vi. 21

Corruption, excessive cold preserves bodies from it—and a great degree of dryness produced by heat, ii. 275—earth, if drying and astringent, produces the same effect, 276—bodies never corrupt at Spitsbergen, though buried for thirty years, 274—men and animals buried in the sands of Arabia, preserved from corruption for ages, as if actually embalmed, 275—bodies buried in the monastery of the Cordeliers at Thoulouse, preserved from corruption, 276—bodies previously embalmed buried in the sands of Chorofan, in Persia, preserved from corruption for a thousand years, 277—amazing preservation from it, in a mummy lately dug up in France, 283

Coryphæna, the razor-fish, its description, vi. 303

Cotopaxi, volcano in South America, described by Ulloa, i. 99—more than three geographical miles above the surface of the sea, 151

Cotton-tree, the seed intoxicates parrots, as wine does man, v. 280

Cottus, the bull-head—description of this fish, vi. 303

Couando, much less than the porcupine—its description, iv. 114

Cougar, the red tyger, by Mr. Buffon, iii. 244—extremely common in South America, 246—in what manner the Indians encounter it, 246, 247

Coulterneb, remarkable bird of the Penguin kind. See *Puffin*.

Country, inhabited before 1666, now deserted—the sands which cover it, i. 364

Cows, allured by music, ii. 169—of ruminant animals, the cow kind deserves the first rank, iii. 8—meanest peasants in Germany, Poland, and Switzerland, kill one cow at

least for their own table—salted and hung up, is preserved as a delicacy the year round—cows want the upper fore-teeth, 9—in no part of Europe cows grow so large, yield more milk, or more readily fatten than in England—make no particular distinction in their herbage, indiscriminately devouring the proper quantity—it gives back more than it takes from the soil—the age of the cow known by the teeth and horns—the number of its teeth, 10, 11—have eight cutting teeth in the lower-jaw—manner of renewing them, 11—the horns more surely determine this animal's age, and how—while this animal lives, the horns lengthen, 12—wants in udder what it has in neck—the larger the dew-lap, the smaller the quantity of its milk—the kind to be found in every part of the world—large in proportion to the richness of the pasture—Africa remarkable for the largest and smallest cattle of this kind; as also India, Poland, and Switzerland—among the Eluth Tartars, the cow so large, that a tall man only can reach the tip of its shoulder, 14—of all quadrupedes, the cow most liable to alteration from its pasture—the breed of the Isle of Man, and most parts of Scotland, much less than in England, also differently shaped, 13—the breed improved by foreign mixture, adapted to supply the imperfections of our own, 12—such as purely British, far inferior in size to those of the Continent, 13—the cow, the urus, and the bison, animals of the same kind—difference in size not so remarkable as those in its form, hair, and horns—many considered as a different kind, and names given them as a distinct species, when in reality all the same, 15—only two varieties of the kind really distinct, the cow and the buffalo—they bear an antipathy to each other—scarce a part of the world where the cow kind is not found, 18—variety of the horns—those in Iceland are without horns, 19—the Barbary cow, or zebu, 23—of all animals, the cow most extensively propagated—an inhabitant of the frozen fields of Iceland, and the burning deserts of Lybia, 24—other animals preserve their nature or their form with inflexible perseverance—the cows suit themselves to the appetites and conveniences of mankind—no animal has a greater variety of kinds, none more humble and pliant, 25—the cow and bison breed among each other—the cow does not breed with the buffalo—no animals more distinct, or have stronger antipathies to each other,

26—the cow goes nine month with young, 31—the grunting or Siberian cow and the little African, or zebu, are different races of the bison, 32—animals of the cow kind, by naturalists extended to eight or ten sorts, reduced to two—an animal of the cow kind, no naturalist has described—the description of it, 33, 34—the Greeks compared the eyes of a beautiful woman to those of a cow, 72—it eats two hundred and seventy-six plants, and rejects two hundred and eighteen, 176

Cow-bexaar, a factitious sort, iii. 76

Crab, a ruminating fish, iii. 5—surprising manner in which the monkeys draw crabs from the water, iv. 228—found in fresh and salt water, and upon land,—description—its intestines have many convolutions, vi. 363, 364—land-crabs of various kinds—some healthful and nourishing—others poisonous or malignant to a great degree—places where found, 364

Violet-crab of the Caribbée islands described—their food—their nippers the principal instrument for seizing and cutting their food—catch such hold, that the limb is lost sooner than the grasp—thus it gets off, leaving its claw fastened upon the enemy—the claw performs its duty, and keeps a minute fastened upon the finger, while the crab makes off—it loses no great matter by a leg or an arm, as they grow again, the animal becomes perfect as before, vi. 365—fatiguing and amazing march from the mountains to the sea-shore, to deposit the spawn, from which, soon after, millions of little crabs are seen slowly travelling up the mountains, 364, 365—wait the benefit of sea-water for their delivery, 366—change their shells—have under their stomachs four white stones, which gradually decrease, as the shell hardens, and when come to perfection, are not to be found, 368—season and manner in which they are caught, 368, 369—in Jamaica they are in great plenty, and considered as one of the greatest delicacies—many of this kind found poisonous, 369, 370

Soldier-crab, vi. 370—seen every year descending from the mountains to the sea shore, to deposit its spawn, and to provide itself with a new shell, 371—contest between them for some well-looking favourite shell, for which they are rivals—strike with their claws—beat each other, till the weakest is obliged to yield and give up the object of dispute, 372—when taken, sends forth a feeble cry, endeavouring to seize the enemy with its nippers—not much esteemed for its flesh, 369

Crane, bred familiarly in our marshes formerly—not now; and why, v. 33—general characteristics and habits of birds of the crane-kind, 366, 367—their food and flesh, 368—description of the crane, 371—Gefner says, its feathers, in his time, were set in gold, and worn as ornaments in caps—description of this bird from ancient writers—who have mixed imagination with history—whence have arisen the fables of supporting their aged parents, 371—and fighting with pigmies—the crane a social bird, and seldom seen alone—usual method of flying or sitting, in flocks of fifty or sixty together; while part feed, the rest keep guard—subsists mostly upon vegetables, 373—are known in every country of Europe, except our own—are birds of passage—seasons of their migrations, during which they do incredible damage, chiefly in the night—were formerly known, and held in great estimation here for the delicacy of their flesh—there was a penalty upon destroying their eggs, 373—Plutarch says, cranes were blinded, kept in coops, and fattened for the tables of the great in Rome; at present, they are considered all over Europe as wretched eating—qualities of its flesh, 374—their note the loudest of all other birds; and often heard in the clouds, when the bird itself is unseen, 375—amazing heights to which they ascend when they fly—though unseen themselves, they have distinct vision of every object below, 376—extraordinary length and contortion of its windpipe—use made of their clangorous sound—they rise but heavily, are shy birds, and seldom let the fowler approach them—their depredations usually in the darkest nights; when they enter a field of corn, and trample it down, as if crossed over by a regiment of men, 377—corn their favourite food, scarce any other comes amiss to them—Rhedi's experiments to this purpose—a little falcon pursues, and often disables it, 378—method used on such occasions by those fond of hawking—barbarous custom of breeding up cranes to be thus baited—easily tamed—Albertus Magnus says, it has a particular affection for man—the female distinguished from the male, by not being bald behind—never lays above two eggs at a time—the young are soon fit to fly; and unfledged, they run with such swiftness that a man cannot easily overtake them, 379, 380—Aldrovandus assures one was kept tame for above forty years—the vulgar bear the crane a compassionate regard—

prejudices in its favour—a heinous offence in some countries to kill a crane, 380—distinctions between the crane and the stork, 382

Crane, the *Balearic*, from the coast of Africa, and the Cape de Verd islands, its description—habits—has been described by the name of the sea-peacock, v. 387, 388—real Balearic crane of Pliny, 386—foreign birds of the crane-kind described: the jabiru, the jabiru-guacu, 388, 389—the an-hima, 389—the buffoon bird, or Numidian crane, described, 390—place where the crane kind seem to have formed their general rendezvous, vi. 9—the flamingo the most remarkable of all the kind, the tallest, bulkiest, and most beautiful, 10—described, 10—small birds of the crane kind, vi. 22

Crantz, history of Greenland, i. 245. See *Krantz*.

Cresus, (king of Lydia) seated on his throne, with all the barbarous pomp of Eastern splendour, asking Solon if he had ever beheld any thing so fine? was answered, that after the beautiful plumage of the pheasant, he could be astonished at no other finery, v. 184

Cricetus, the *German rat*, by Mr. Buffon called the hamster, iv. 81—Its description—is the greatest pest in the countries where found, and every method made use of to destroy it—its hole a curious object for contemplation; shews a skill superior to the rest of the rat kind—description of it—their storehouses, 82—contain two bushels of good grain in each apartment—means of finding out their retreats, 83—produce young twice or thrice a year, and bring five or six at a time, 84—their devastations produce a famine—they destroy each other—their fur very valuable, 84

Cricket, a ruminating insect, or seemingly so, iii. 6—difference from the grasshopper, vii. 349—their voice, 350—food, 351—never drink—sound of drums and trumpets make them forsake their situation, 351

Mole-cricket, described, thought to be amphibious, vii. 352—the number of their eggs—a most detested insect by gardeners—its devastations—recations of the female against the black beetle, 353—their care and assiduity in the preservation of their young, 354

Crochet, in the head of a stag, iii. 114

Crocodil, extraordinary combat between this animal and the tiger, iii. 247—the ichneumon discovers and destroys its eggs—kills its young, and sometimes entering the mouth of the crocodile, when sleeping on the shore, effectually de-

stroys
amoun
found
120—
comp
—tern
betwe
seizes
malin
—oft
and
along
we br
peopl
the ri
play
witho
on, it
arms
fels—
their
to th
form
vivip
to cr
age,
138
C
C
C
Yati
C
C
222
layi
crow
C
mit
C
C
por

destroys it, 377—the eggs it lays in the sand at a time, often amount to three or four hundred, 380—the places where found, together with their dimensions, vii. 118—description, 120—several examples of taking a man out of a canoe from his companions, notwithstanding all opposition and assistance, 125—terrible even upon land—its depredations, 126—combats between the crocodile and the tiger, 127—in what manner it seizes its prey, 126—how a negroe ventures to attack this animal in its own element, 128—manner of taking it in Siam, 129—often managed like a horse; a curb put into its mouth, and the rider directs it as he likes—manner of taking it along the rivers of Africa—pools of water where bred as we breed carp in our ponds, 130—in Egypt and other long peopled countries, this animal solitary and fearful, 131—in the river San Domingo, they are most inoffensive, children play with them, and ride about on their backs; beat them without receiving the smallest injury, 132—probable opinion, its musky substance amassed in glands under the legs and arms—its flesh—the eggs to the savages most delicate morsels—all breed near fresh waters—precautions in laying their eggs, 133—the female having introduced her young to their natural element, she, and the male, become their most formidable enemies, 135—the open bellied crocodile, thought viviparous, has a false belly like the opossum, for the young to creep out and in as danger or necessity requires—their age, 137—produced to fight at the amphitheatre at Rome, 138

Croppers, a kind of pigeons, v. 293

Crosbill, a bird of the sparrow kind, v. 315

Croft fox, animal between the dog and fox, iii. 341. See *Isatis*.

Crown, in the head of a stag, iii. 114

Crows, fetch and carry with the docility of a spaniel, v. 222—the *carriion-crow* resembles the raven in appetites, laying, and manner of bringing up its young—the *Rossan* crow, 230

Cruelty, teaching the arts of cruelty, equivalent to committing them, v. 164

Crustaceous, animals of the lobster kind, vi. 352

Cub, the fox is so called during the first year, iii. 328—born blind, like those of the dog, 331

Cuckoo, fables invented of this bird, now sufficiently refuted, where it resides in winter, or how provides for its supply during that season, still undiscovered—this bird somewhat less than a pigeon, shaped like a magpie, and of a greyish colour, is distinguished from all other by its round prominent nostrils—discovers itself in our country early in the spring, by its well known call—its note heard earlier or later as the season is more or less forward, and the weather inviting—from the cheerful voice of this bird the farmer instructed in the real advancement of the year—history and nature of this bird still in great obscurity, v. 263—its call an invitation to courtship, used only by the male, generally perched upon a dead tree, or bare bough, repeating his song, which he loses when the genial season is over—his note pleasant, though uniform—the female makes no nest, 264—repairs to the nest of some other bird, generally the water wag-tail or hedge-sparrow, and, after devouring the eggs of the owner, lays hers in their place, 265—usually lays but one, this the little foolish bird hatches with great assiduity, and when excluded, fondly thinks the great ill-looking changeling her own—to supply this voracious creature, the credulous nurse toils with unwearied labour, not sensible she is feeding up an enemy to her race, 265—the stomach of this bird is enormous, and reaches from the breast bone to the vent, 266—its food, 265—naturally weak and fearful—the smaller birds form a train of pursuers; the wry-neck, in particular, the most active in the chace, 266—supposed, in winter, to lie hid in hollow trees; or to pass into warmer climates—story of a cuckoo found in a willow log, in winter, 267—probable opinion concerning its residence in winter—Briffon makes not less than twenty-eight sorts of this bird; and talks of one of Brazil, as making a horrible noise in the forests; 268—follows a very different trade from what its nurse endeavoured to teach it; and, according to Pliny, in time destroys its instructor, vi. 125

Cuckoo-spit, or *Froth-worm*, its description, vii. 358

Cud, the hare, the rabbit, and the squirrel, placed by *Pierius* among those that chew the cud; how far true is not determined, iv. 3

Cuguacu'apara, name in Brazil for the roe-buck, iii. 140

Cummin seed, formerly used in dressing a hare in true Roman taste, iv. 15

Cur, the *Cur-fox*, iii. 332

Crusichaff, a lake where the sturgeon is found in greatest numbers, vi. 273

Curlaw, a small bird of the crane kind—its dimensions, vi. 23—places where found—manner of procuring its food, 25—its habits, 24—its nest, and number of eggs—season of courtship, vi. 31—a bird of passage, 28

Current, indigestible to man when swallowed whole, v. 74

Currents of rivers well explained by the Italians, i. 200—side current—back current, 205—sometimes the current at bottom swifter than at top; and when—double current, 206—found to run in all directions, 260—manner in which mariners judge of the setting and rapidity of the current—currents are generally found most violent under the equator, 261—a passage with the current gone in two days, with difficulty performed in six weeks against it—currents do not extend above twenty leagues from the coast—the currents at Sumatra extremely rapid, run from south to north—also strong currents between Madagascar and the Cape of Good Hope; but the most remarkable are those continually flowing into the Mediterranean sea, 262—current runs one way at top, and the ebb another way at bottom, 264

Current of air, driven through a contracted space, grows more violent and irresistible, i. 355

Cusco, Garcilasso de la Vega asserts the air is so dry and so cold there, that flesh dries like wood, without corrupting, ii. 274

Custom, the form of the face seems rather the result of custom, ii. 238

Cuttle-fish, its description—contrivance with which it is furnished by nature, when under a difficulty of escaping, viii. 177

Cybotus, a lofty mountain swallowed by an earthquake, i. 162

Cynocephalus, the *Magot* of Buffon, the last of the ape kind—its description—is a native of Africa and the East, iv. 207

Cyprinus, or the carp, vi. 308

Czar of Russia. See *Peter of Russia*

D.

Dam, in the rapacious kinds, leads her young forth for months together; it is not so with those of the hare kind, iv. 5

Dampier, has added more to natural history than half the philosophers before him, vi. 391

Damps, of various natures in mines—the fulminating sort, i. 79, 80

Dance, hares taught to dance to music, iv. 9.

Dancer, a dog of the mongrel kind, iii. 286

Dane, the tallest dog bred in England, iii. 286, 290

Danube, has seven openings into the Euxine sea, i. 332—proceeds from the Alps, 142—its course—the Turks and Christians have fleets of men of war upon it, 209—it receives thirty lesser rivers, 217—the huso, or singlass fish, caught in great quantities in this river, vi. 278

Dara, its inhabitants use ostriches as horses, v. 6

Darien, an isthmus—has a particular hog called warree—described by Wafer, iii. 196

Darkness, surprising how far the eye accommodates itself to it, ii. 160—remarkable instance of it, in a gentleman, a major under Charles the First, ii. 161

Daubenton, gives a complete history of a dwarf, ii. 254

Deaf men, often found to see the force of those reasonings, which they could not hear, understanding every word as it was spoken, ii. 90—one born deaf, must necessarily be dumb, 174—instances of two young men, who, born deaf, were restored to hearing, 174—a person born deaf, by time and pains taught to write, read, speak, and by the motion of the lips, to understand what is said; instances of it, 176

Deafness, one of the most common disorders in old age, ii. 172—way to know this defect either internal, or external, 173

Death, a young man born deaf and dumb, knew nothing of death, and never thought of it till the age of twenty-four, when he began to speak of a sudden, ii. 176—a spectre which frights us at a distance, but disappears when we come to approach it, 206—uncertainty of the signs of death, 208

Deer, annually shedding horns, and their permanence in the sheep, draws a distinct line between their kinds, iii. 36—the little Guinea deer, the least of all cloven-footed quadrupedes, and most beautiful—its description, 82—the male in Guinea has horns, but the female is without,—they abound in Java and Ceylon, 83—all of the deer kind want the gall-bladder, 94—a downy substance like velvet upon the skin covering the skull of a deer when the old horn is fallen off, 96,—their horns grow differently

from those of sheep or cows—they are furrowed along the sides, and why, 97—the bran deer, or the brown deer, called by the ancients tragelaphus, found in the forests of Germany, 122—the new continent of America produces animals of the deer kind, in sufficient plenty, 123.

Fallow Deer, no animals more nearly allied than the stag and fallow deer, yet they never herd nor engender together, nor form a mixed breed—each form distinct families, and retain an unalterable aversion—the fallow deer rarely wild in the forests; are in general bred in parks, and their flesh is preferred to that of any other animal, iii. 125—a herd of them divides into two parties, and engages each other with great ardour and obstinacy, 126—both desirous of gaining a favourite spot of the park for pasture, and of driving the vanquished into the more disagreeable parts—manner of their combats—are easily tamed—and browse closer than the stag 127—they seek the female at their second year, 128—their strength, cunning, and courage inferior to those of the stag—we have in England two varieties of the fallow deer; one brought from Bengal the other from Norway, 129—flesh of the French fallow deer, has not the fatness nor the flavour of that fed upon English pasture—Spanish and Virginian fallow deer, 130—deer without horns, their description, 130

Rein-Deer, the most extraordinary and most useful—native of the icy regions of the North, it answers the purposes of an horse—attempts made to accustom it to a more southern climate, in a few months it declines and dies, iii. 149—answers the purposes of a cow in giving milk; and of the sheep in furnishing warm clothing to the people of Lapland and Greenland, 150—description of the rein deer—its rutting-time, and that of shedding its horns, 150—difference between this deer and the stag—it is not known to the natives of Siberia—Americans call it caribou—herdsmen of Lapland known to possess a thousand rein-deer in a single herd, 153—it subsists upon moss 154—and makes the riches of the people of Lapland, 155—gnats and gadflies very formidable to this deer in Lapland, 156—female brings forth in May—its milk thinner than that of the cow; sweeter and more nourishing, 158—is of two kinds in Lapland, 162—it draws sledges—can go about thirty miles without halting, and without dangerous effort—generally castrated

by the Laplanders—one male left for six females—begin to breed when two years old, 163—go with young eight months, and bring two at a time—fondness of the dam remarkable—live but fifteen or sixteen years—manner in which the Laplanders kill them—scarce any part of this animal not converted to peculiar uses, 164—the Laplanders find their necessities supplied from the rein deer alone; in what manner, 166—diseases of this animal, 168—the blood of the rein deer preserved in small casks, for sauce with the marrow in spring—the horns converted into glue—the sinews make the strong sowing thread—the tongues a great delicacy—the intestines washed like our tripe, in high esteem among the Laplanders, 167—bears make depredations upon the rein-deer, 169—glutton its most dangerous and successful persecutor—only method of escape from this creature, 170—in what manner the rein-deer is killed by it, 398—the wolf never attacks a rein-deer that is haltered in Lapland, and why, 321

Deformity, children often inherit even the accidental deformities of their parents—instances of it, ii. 238—accidental deformities become natural; by assiduity continued and increased, through successive generations, 239—all those changes the African, the Asiatic, or the American undergo, in their colour, are accidental deformities, probably to be removed, 242

Demoiselle, name given by the French to the Numidian bird, v. 390

Denmark, Henry IV. king of Denmark, desirous of trying whether a musician, who boasted of exciting men to madness, was an impostor, submitted to the operation of his skill, became mad—and killed four of his attendants in his transports, ii. 170

Depena, a large serpent, native of Mexico, vii. 227

Derbent, pastures in these plains excellent for rearing horses, ii. 361

Derbyshire, description of the nest of an eagle found in the peak of Derbyshire, v. 93

Derbam, by a microscope, discovered in the eye of a mole, the parts known in other animals, iv. 92

Desman, one of the three distinctions of the musk rat—a native of Lapland, iv. 78

Devil, the Swedish Laplanders consult him, ii. 214

Devil (sea,) or fishing frog described, vi. 282

Dew, compensates the want of showers in Egypt, i. 358--
hares quench their thirst with it, iv. 7

Dewlap, of two zebras, seen by the author, the skin hung loose below the jaw upon the neck, in a kind of dewlap, ii. 398--the cow wants in udder what it has in neck, and the larger the dewlap, the smaller the quantity of its milk, iii. 14

Diablerets, a mountain in France suddenly fallen down---its ruins covered an extent of a league square, i. 157

Dictionaries of Arts and Sciences, a fault that has infected most of them, ii. 307

Diet, of a thin sparing kind remarkable among quadrupedes, as well as the human species, to produce hair, iii. 355

Digester an instrument---meat and bones put into it, dissolved into a jelly in six or eight minutes, i. 308

Digestion, these organs in birds are in a manner reversed, v. 16---is not perfect in all birds that live upon mice, lizards, or such like food, 142---performed by some unknown principle in the stomach, acting in a manner different from all kinds of artificial maceration---this animal power lodged in the maw in fishes, vi. 163

Diseases, of the rein deer---the manner in which the Laplanders cure them, iii. 168

Disorders, infectious, propagated by the effluvia, from diseased bodies, i. 327---most of those incident to mankind, says Bacon, arise from the changes of the atmosphere, vi. 170---fishes have their disorders, 341

Diver, (the great northern) a bird of the smaller tribe of the penguin kind---the grey speckled diver, vi. 98---the scarlet throated diver, 99

Divers, known to descend from twenty to thirty fathom, i. 288---of all those who have brought information from the bottom of the deep, Nicola Pesce, the most celebrated---account of his performances by Kircher, 293---some known to continue three quarters of an hour under water without breathing---they usually die consumptive, vii. 58---manner of fishing for pearls, 59

Dodo, its description, v. 76---among birds, as the sloth among quadrupedes, an unresisting animal, equally incapable of flight or defence---native of the Isle of France; the Dutch first discovered and called it the nauseous bird---travellers

deem its flesh good and wholesome, v. 77---it is easily taken
---three or four dodos enough to dine an hundred men---
whether the dodo be the same bird with that described under
the name of bird of Nazareth, remains uncertain, 78

Dee, the female of the deer kind, iii. 128

Dogs, always running with their noses to the ground, sup-
posed of old the first that felt infection, i. 319---no other
animal of the carnivorous kind will make a voluntary at-
tack, but with the odds on their side, ii. 319---the Arabian
horses out-run them, 347---in the dog kind the chief power
lies in the under jaw, iii. 200---in Syria; remarkable for
the fine glossy length and softness of their hair, 212---in trop-
ical climates lose the delicacy of their scent, and why---the
lion, tiger, panther, and ounce, all natural enemies to the
dog, 262---their proper prey are animals unfitted for climb-
ing, 271---dog kind not so solitary as those of the cat,
270---they can live for some time upon fruits and vege-
tables, 272---description of the dog---knows a beg-
gar by his clothes, by his voice, or his gestures, and
forbids his approach, 273---the dog most susceptible of
change in its form, 278---all dogs are of one kind, which
the original of all the rest, which the savage dog, whence
such a variety of descendants, is no easy matter to determine,
280---the shepherd's the primitive animal of his kind, 281
---by instinct, without education, dogs take care of flocks
and herds, 310---those wild in America and Congo, as those
of Siberia, Lapland, Iceland, of the Cape of Good Hope;
of Madagascar, Calicut, and Malabar, resemble the shep-
herd's dog, 281---those in Guinea, at the second or third
generation, forget to bark, 282---dogs of Albany, of Greece,
of Denmark, and of Ireland, larger, and stronger than any
other---shepherd's dog, transported into temperate climates,
and among people entirely civilized, from influence of cli-
mate and food alone, becomes a *matin*, a *massiff*, or a *hound*,
283---*Turkish dog*, 284---*great Danish dog*, 284---*great wolf*
dog, or *Irish wolf dog*, 284,---*little Danish dog*, 284---their
variety now in England, much greater than in the times of
queen Elizabeth, 285---Dr. Caus divides the whole race
into three kinds---the generous; the farm kind; the mon-
grel, 186---three shepherd's dogs reckoned a match for a
bear, and four for a lion; three of them overcame a lion in
the time of king James the First---the famous poet Lord
Surry, the first who taught dogs to set, 289---the *pug dogs*

290---the *lion dog*, originally from Malta---its description, 291---the *Melassian dogs* of the ancients, according to Mr. Buffon, 293---*Epirotic dogs*, mentioned by Pliny, 295---*Indian dogs*, mentioned by *Ælian*---his description of a combat between a dog and a lion, 295---the English *bull dog*, 296---the bravest of the kind---the nobler kinds of dogs, of which such beautiful ancient descriptions, now utterly unknown, 295---puppies eyes not open till ten or twelve days old---dog's teeth amount to forty-two, 302---this animal capable of reproducing at the age of twelve months, goes nine weeks with young, and lives about twelve years, 303---other particulars concerning dogs---many kinds of birds the dogs will not touch---dogs and vultures living wild about Grand Cairo in Egypt, continue together in an amicable manner, and are known to bring up their young in the same nest---dogs bear hunger for a long time; a bitch forgotten in a country-house, lived forty days without any other sustenance than the wool of a quilt she had torn in pieces, 304---the wild hunt in packs---unknown, such as he was before the protection of man; some from a domestic state, have turned savage, and partaken of the disposition of the wolf, and attack the most formidable animals of the forest, 276---are easily tamed, and quickly become familiar and submissive, 277---experiments to prove the wolf and the fox not of the same nature with the dog, but of a species perfectly distinct, 298---a dog set at liberty, in his savage fury flew upon every animal, fowls, dogs, and men, 300---animals in this country bred between a dog and a fox, 298---the dog and wolf so much alike internally, that anatomists can scarce perceive the difference, 305---a young dog shudders at the sight of a wolf---dogs and wolves so different in their dispositions, that no animals have a more perfect antipathy, 299---shew no appetite to enjoy their victory when the wolf is killed, but leave him where he falls, 318---Catesby asserts the wolf was the only dog used by the Americans, before the Europeans came among them, and that they have since procreated together; thus proving the dog and the wolf of the same species, 322---unfurmoutable antipathy between the dog and the jackall; they never part without an engagement, 338---famished dogs more hairy than those whose food has been more plentiful, 355---all kinds pursue the hare by instinct and follow it more eagerly than other animals, iv. §

—few dogs dare to encounter the otter, 153—some purposely trained for discovering the retreat of the otter, 155

Dog butchers all over China, and shambles for selling their flesh; wherever a dog butcher appears, all the dogs of the place are in full cry after him—along the coasts of Guinea, their flesh is esteemed a delicacy by the negroes; they give a cow for a dog, iii. 297

Dolphin caught in the Red Sea, known by a ring to be the same taken before in the Mediterranean, i. 263—allured by music, ii. 168—not easy to assign a cause why the ancients have invented so many fables on the subject, vi. 219—their boundings in the water, have taught mariners to prepare for a storm—old painters and sculptors have drawn them wrong; the poets have adopted the error, 220—Pliny has asserted, they instantly die when taken out of the water; Rondelet assures us, he has seen a dolphin carried alive from Montpellier to Lyons, 221—their motions the gambols of pleasure, or the agitations of terror, not well known—in fairer weather, they herd together, and pursue shoals of various fish with impetuosity, 221

Dolpbon, is also the name of the ophidium, or the gilt-headed, vi. 300

Don, or *Tanais*, a river, its course, i. 209—the sturgeon is caught in great quantities at the mouth of that river, vi. 273

Dorados, a fish of the spinous kind, the most voracious, vi. 334—its description—the flying-fish is chiefly sought by it—warfare carried on between them, 335—supposed a ruminating fish, iii. 5

Doree, description of this fish, vi. 305

Dormouse, the mercury of the thermometer plunged into the body of a living dormouse, never rose beyond its pitch in air, and sometimes sunk above a degree, iv. 45—the greater sort Mr. Buffon calls the *leir*; the middle size he calls the *lerot*; and the less he denominates the *muscardin*, 76—their descriptions—agree in being stupified like the marmot during winter, 76—their nests and provisions they bring forth three or four young at a time, but once a year, in spring, 77

Dor-beetle, or *May-bug*, viii. 130. See *Beetle*.

Dotrel, small bird of the crane kind, vi. 23

Doves, the *ring-dove*, v. 293—the *turtle-dove*, 290—the *stock-dove*, 285. See *Pigeon*.

Donc, a monkey of the ancient continent, so called in Cochinchina, where it is a native---its description---forms part of the chain by which the monkeys of one continent are linked with those of the other, iv. 235

Draco volans, a flying ball of fire, i. 380

Drag, name given by the huntsmen to the tail of the fox, iii. 328

Dragons, the whole race dwindled down to the flying lizard, vii. 156

Dragon-fly, or the libella, described, vii. 316

Dragonet, description of this fish, vi. 302

Dreams of Arlotto, ii. 142---he was taken to the Inquisition, and had like to have been condemned for them, 143

Dress, the first impression generally made, arises from dress, ii. 99

Drill, of Purchas, an ape of the kind of the ouran outang, iv. 189

Dromedary, a sort of camel, iv. 302

Drones, a ruminating insect, or seemingly so, iii. 6

Drones, the second sort of bees, supposed to be the males, viii. 66---their cells, 72---the working bees kill the drones in the worm state, in the cell, and eject them from the hive, among the general carnage, 86

Drugs in the tropical climates lose their virtue, and become verminous, i. 314

Drum, among the Swedish Laplanders every family has one for consulting the devil, ii. 214---hares taught to beat the drum, iv. 9

Dryness, a great degree of it produced by heat, preserves from corruption, ii. 275

Duck, its eggs often laid under a hen, vi. 125---seems a heedless inattentive mother, 126---of the tame duck ten different sorts; and of the wild, Brisson reckons above twenty---the most obvious distinction between the wild and tame ducks---difference between wild ducks among each other---sea and pond ducks---names of the most common birds of the duck kind, among ourselves, and of the most noted of the foreign tribe, 127---their habits, nests, and number of eggs, 129---are, in general, birds of passage---their flesh, 132---the ducks flying in the air, often lured down from their heights, by the loud voice of the mallard from below, 132---what part of the lake they generally choose, 133---

what can employ them all day, not easy to guess—manner of making and managing a decoy to take them, 133—when ducks are caught, the men keep a piece of turf burning near their mouths, and breathe upon it, lest the fowl smelling them, should escape, v. 11—general season for catching them in decoys, from the end of October till February—taking them earlier prohibited by an act of George the second, imposing a penalty of five shillings for every bird destroyed at any other season—amazing quantity of ducks sent to supply the markets of London, vi. 137—manner of taking them frequently practised in China, 137—the American wood-duck, 128—of the numerous tribes of the duck kind, no more than five breed here, v. 34—Plutarch assures us, Cato kept his family in health, feeding them with duck, whenever they threatened to be out of order, vi. 109.

Dumb, one born deaf, must necessarily be dumb, ii. 174—a young man deaf and dumb from his birth, began to speak all of a sudden, 175.

Dung, some animals void it when pursued—this arises rather from fear than a desire of defence, iii. 32.

Dunlin, a small bird of the crane kind, vi. 23.

Dutch, solicitous about the preservation of the flock, in every part of their republic, v. 383.

Dwarfs, in England, as late as the times of king James the first, the court was furnished with one—and he was called Little Jeffery—Peter of Russia celebrated a marriage of dwarfs, ii. 251—they seem to have faculties resembling those of children, 254—history of a dwarf accurately related by Mr. Daubenton, ii. 284.

Dwina, a river, its course and source, i. 210.

E.

Eagle kinds, distinctive marks from the other kinds of carnivorous birds, v. 85—the golden eagle is the largest and the noblest of all those birds designed by the name of eagle, 87—its description—considered among birds, as the lion among quadrupeds, 87—strong similitude to each other—great patience, and much art, required to tame an eagle; though take young, and brought under by long assiduity, yet it is a dangerous domestic, and often turns its force against its master, v. 89—sometimes has an attachment for its feeder; it is then serviceable and will provide for his pleasures and support—flies the highest of all birds, and

from thence has by the ancients been called the bird of heaven—it has also the quickest eye; but its sense of smelling is far inferior to that of the vulture—it never pursues, but in sight, 90—finds difficulty in rising when down—carries away geese, cranes, hares, lambs, and kids, and often destroys fawns and calves, to drink their blood, and carries a part of their flesh to its retreats—infants, when left unattended, have been destroyed by these rapacious creatures—the eagle is peculiarly formidable when bringing up its young—a poor man got a comfortable subsistence for his family, during a summer of famine, out of an eagle's nest, by robbing the eaglets of food, 91—eagles killed a peasant who had robbed their nests—there is a law in the Orkney islands, which entitles any person that kills an eagle to a hen out of every house in the parish, in which the plunderer is killed—the nest of the eagle is usually built in the most inaccessible cliff of the rock, 92—description of one found in the Peak of Derbyshire—it hatches its eggs for thirty days—very rare to find three eaglets in the same nest; and it is asserted, that the mother kills the most feeble, or the most voracious, 93—it is believed they live above an hundred years, and that they die, not of old age, but from the beaks turning inward upon the under jaw, and preventing their taking any food—an eagle endured hunger for twenty-one days, without any sustenance whatever—they are first white, then inclining to yellow, and at last light brown, 94—age, hunger, captivity, and diseases, make them whiter—those kept tame are fed with every kind of flesh, fresh or corrupting; and upon a deficiency of that, bread, or any other provision, will suffice—it is dangerous approaching them, if not quite tame, and they sometimes send forth a loud piercing lamentable cry, which renders them still more formidable—they drink but seldom, and perhaps when at liberty, not at all, 95—the bald eagle an inhabitant of North Carolina—breeds in that country all the year round,—manner in which the eggs are hatched—characteristics and habitudes of this animal—its nest is large enough to fill the body of a cart, and commonly full of bones half eaten, and putrid flesh, the stench of which is intolerable, 96—the flap, of an eagle's wing known to lay a man dead in an instant, 9—it flies at the bustard or the pheasant, 81—

Eagle, the *sea-eagle* called *aquila piombina* by the Italians, y. 95—they often lay three or four eggs, of a less size than those of a hen, of a white elliptical form—distinctive marks of the *golden eagle*, of the *common eagle*, of the *bald eagle*, of the *white eagle*, of the *rough-footed eagle*, of the *white-tailed eagle*, of the *erne*, of the *black-eagle*, 97—of the *sea-eagle*, of the *osprey*, of the *jean le blanc*, of the *Brazil eagle*, of the *Oroonoko eagle*, of the *crowned African eagle*, of the *eagle of Pondicherry*, 98.

Ears, distinguishing features in quadrupedes—serve in them as principal marks of the passions—smallest ears in men said to be most beautiful—the largest the best for hearing—some savage nations bore their ears, and draw that part down, till the tip of the ear rests upon the shoulder, ii. 95—the richest jewels in an *Æthiop's* ear, a proverb, 98—undulations, which strike the ear, supposed but one continued sound, by their quick successions, though in reality they make many, 163—persons hear differently with one ear from the other—these have what musicians call a bad ear; and as hearing false, also sing false—such persons also deceived as to the side whence the sound comes, 173—from what cause the small ears of the *Tartars* and *Chinese*, 239—those of the hare moveable and capable of direction to every quarter, iv. 4.—are remarkably good, 9—birds have not the external ear standing out from the head—probably the feathers encompassing the ear-holes, supply the defect of the exterior ear, v. 11.

Earth, its globe a million of times less than the sun, i. 3—placed at a happy middle distance from the centre, in our solar system—less distant from the sun than *Saturn*, *Jupiter*, and *Mars*, and less parched up than *Venus* and *Mercury*, situated too near the violence of its power, 8, 9—the earth, like a chariot-wheel, has a compound motion, 9—its roundness proved, 9—is rather flattened at the poles, and its form resembles that of a turnip, 9. 10—considered as one scene of extensive desolation, 21—supposed by *Buffon* a globe of glass—by *Whiston* a sphere of heated iron—by *Kircher* one dreadful volcano—by *Burnet* a great mass of water, 51, 52—composed of different layers or beds, lying horizontally one over the other, like the leaves of a book, 52.

Garden-earth, or mould-earth, a kind of mother, never found an enemy to man, i. 52—black earth formed by decayed leaves and branches in Burgundy, 55—drying and astringent earth preserves bodies from corruption, ii. 276—all such earths as ferment with vinegar, are a composition of shells, decayed, and crumbled down to one uniform mass, vii. 13

Earthquakes frequent through the whole region, where a volcano is situated, i. 88—vari us kinds of them distinguished by philosophers, 104—and by Mr. Buffon—air the only active operator in them, 105—several opinions upon the cause of them, 108—activity of internal heat alone sufficient to account for every appearance attending earthquakes; twelve cities in Asia Minor swallowed up in one night—extraordinary earthquake related by Pliny, 109, 110—account of that in the year 1693, extending to a circumference of two thousand six hundred leagues, 111—minute description of that in Jamaica in 1992, 112—account of the dreadful shock in Calabria in 1638, 115—concomitant circumstances attending earthquakes, 121.

Earth-worm of America often a yard in length, and as thick as a walking cane, ii. 6—multiplied by being cut in pieces, 23—its description, viii. 167. See *Worm*.

Ear-wig, its habits, vii. 355—reproaches groundless about this animal, 356—its food—general characteristics of the kind, 357—lives in its winged state a few days—dies to all appearance consumptive, 358

East Indies, favourable months of embarking for them, i. 346

Echeneis, the sucking-fish—its description, vi. 306

Echini, or urchins, a multivalve shell-fish, vii. 61. See *Urchins*.

Echo, no art can make an echo, ii. 172

Egar, king of England, the first who attempted to rid this kingdom of wolves, and in what manner, iii. 319

Edward I. issued his mandate to Peter Corbet to superintend, and assist in the destruction of wolves, iii. 320

Edward III. made it felony to steal an hawk, v. 118

Edward IV. his act concerning swans, vi. 113.

Eel, described, vi. 305

Effluvia from diseased bodies propagates disorders called infectious, i. 327

Egg, all birds, most fishes, and many of the insect tribes, brought forth from eggs, ii. 26—warmth of the sun, or of a stove, efficacious in bringing the animal in the egg to perfection, ii. 27—its description, 28—history of the chicken in the egg to its complete formation, 30—quadrupedes brought forth from the egg, above two hundred at a time, 339—the ichneumon discovers and destroys the eggs of the crocodile, iii. 377—the crocodile lays in the sand at a time three or four hundred, 380—some eggs only addled by incubation, v. 24—such birds as undisturbed lay, but two or three eggs—when their eggs are stolen, lay ten or twelve—a common hen, moderately fed, lays above an hundred from the beginning of spring, to the latter end of autumn, 30—some of the ostrich's weigh above fifteen pounds, 56—Galen thought the eggs of hens and pheasants good to be eaten—those of geese and ostriches are the worst of all, 63—and those hatched in the hot sand, where laid, 66—taking the eggs of an hawk, punished with imprisonment, and a fine, at the king's pleasure, in the reign of Edward III. v. 118—inhabitants of Norway prepare from the eggs of the porpessa a kind of caviar, or delicate sauce, and good when eaten with bread, vi. 224—manner in which the eggs of fishes are impregnated, wholly unknown 332—doubts whether fish come from the egg completely formed, 330—those of the turtle hatched by the sun, 397

(*Eggs-Sea*,) name given in our cabinets to a multivalve shell-fish called echini, or urchins, by naturalists, vii. 61—those of the sea urchin a great delicacy, 63—opening the body of a queen bee, there appeared in it five thousand eggs, 76

Eglantine, found in a well dug at Marly, i. 57

Egypt, has south winds so hot during summer, that respiration is almost stopped by them—they are charged with such quantities of sand, that they darken the air, as with a cloud—it rains very seldom in that country—but the want of showers is compensated by the copiousness of their dews, i. 357—the catacombs, ii. 277—a mummy, not long since dug up in France, shews the art of embalming was more completely understood in the western world, than in Egypt itself, 283—the Tingitanians and Egyptians have now the

same of rearing the finest horses, both for size and beauty, 356—the ichneumon used in this kingdom, for the same purposes that cats are in Europe, iii. 376

Egyptians, carried the art of embalming to the highest perfection, ii. 267—copious detail of it, 268—paid divine honours to the ibis, v. 384—Maillet's observations concerning this bird, 385

Eider duck, vi. 127—remarkable for the warmth of its nest, 130

Elaboratory, bowels of ruminating animals considered as an elaboratory, with vessels in it, iii. 3—the chymical apparatus for hatching chickens, v. 168

Elasticity of the air, i. 299

Elder-berries, hurtful to cocks, v. 170

Elephant, not less remarkable for its size than its docility—all historians concur in giving it the character of the most sagacious animal next to man, iv. 252—its height from seven to fifteen feet—impossible to give an idea of this animal's figure by description; assisted by the art of the engraver, it will but confusedly represent the original, 253—general observations about its conformation—of all quadrupeds, the elephant the strongest, and largest; yet neither fierce, nor formidable—in its native deserts seldom alone, being a social friendly creature, 254—the oldest conducts the band; the next in seniority brings up the rear—order maintained in dangerous marches—never so far asunder as to be incapable of reciprocal assistance—their invasions the more disagreeable, there being no means of repelling them; since an attempt to molest a drove would certainly be fatal, 255—manner of going against him who offers the insult—do no personal injury when suffered to feed uninterrupted—molested by man, they seek all occasions to be revenged—where they like best to live in their natural state—cannot live far from water; and always disturb it before they drink—often fill their trunk with water, to cool it, or by way of play to spurt it out like a fountain—equally distressed by the extremes of heat and cold—swim from the continent into islands some leagues distant, 256—frequently migrate from one country to another; and why—their food of the vegetable kind, loathing all sort of animal diet—one finding a spot of good pasture, invites the rest to partake of it—precautions by negroes and Indians against them—they of-

ten break through their fence, destroy the harvest, overturn their habitations, and then retreat in order, as they made the irruption, 257—looks with attention and friendship at its master—its ears wipe its eyes, and cover them against the dust and flies—it likes music, learns to beat time, moves in measure, and join its voice to the sound of the drum and trumpet—is pleased with the odours that delight man, 258—the orange flower particularly grateful to its taste and smell—picks up flowers, and is pleased with the scent—seeks the most odiferous plants for food; prefers the cocoa, the banana, the palm, and the sago tree to all others—eats plants to the roots—their sense of touching most delicate—description of its trunk—serving all the purposes of an hand—breathes, drinks, and smells through the trunk, 259, 260—takes a pin from the ground, unties knots of a rope, unlocks a door, and writes with a pen, 266—an object too large for the trunk to grasp, is sucked up by its breath, lifted and sustained—the trunk its organ of smelling, of touching, of suction, of ornament, and defence—its neck so short that it must turn about to discover what is behind, 261—how the hunters escape its resentment—a description of its legs, 262—while young, it bends the legs: but when old or sickly, it wants human assistance, and chuses to sleep standing—a description of its feet, 262—and of its tusks—these, with age, become so heavy, that it is obliged to rest them in holes in the walls of its stall—they are two—their amazing size—they proceed from the upper jaw, not from the frontal bones—and are not horns, as some have supposed—nor ever shed in a domestic state, ii. 263—Ælian saw an elephant write Latin characters on a board, his keeper only shewing him the figure of each letter, iv. 261—extraordinary manner of eating—is not a ruminating animal—its stomach and intestines resemble those of an horse—opinion that the young elephant sucks with its trunk not with its mouth; referred to future discoverers, 264—the skin not covered with hair, a few bristles in the scars and wrinkles of the body, and thinly scattered over the skin, the hide resembles the bark of an old tree more than the skin of an animal—is subject to that disorder known by the name of elephantiasis, or Arabian leprosy, 265—in what manner the Indians endeavour to prevent it—the flies torment this animal incessantly—what arts it tries to keep them off—in a state of nature, it rarely

quits the river, and often stands in water up to the belly, 265—from time immemorial employed for the purposes of labour, of war, to increase the grandeur of eastern princes, or to extend their dominions—is a native of Africa and Asia—still retains its natural liberty in Africa—during the splendour of the Carthaginian empire they were used in the wars, 267—no elephants found on this side mount Atlas—places where they are in great numbers—the greatest elephants found in Asia, their price increases in proportion to their size, 268—the largest kept for princes—their colour—that appropriated for the monarch's own riding, kept in a palace attended by nobles, and almost adored by the people—opinions concerning the white elephant—the eastern princes maintain as many elephants as they are able, and place great confidence on their assistance in an engagement—they never breed in a state of servitude, and the generative powers fail when it comes under the dominion of man, 269—duration of pregnancy, in the female still a secret—what Aristotle and others say concerning this and their young is doubtful, 270—method of taking them wild in the woods, 271—negroes of Africa, who hunt this animal for its flesh, take it in pit-falls, 273—its attachment to the person who attends it—it comprehends several of the signs made to it, distinguishes the tone of command from that of anger or approbation, and acts accordingly—executing orders with prudence, eagerly, yet without precipitation—is taught to kneel down, to receive its rider, usually mounted upon its neck—caresses those it knows, salutes such as ordered to distinguish, and helps to take up part of its load—takes a pleasure in the finery of its trappings—draws chariots, cannon, or shipping with strength and perseverance; and satisfaction, provided it be not corrected without a cause, and that its master be pleased with its exertions—in what manner the conductor guides it—frequently takes such an affection to its keeper as to obey no other; has been known to die of grief for killing its conductor in a fit of madness—surprising instance of moderation in its fury—a word sufficient to put it into motion, 275—a century or two ago the Indian generals made great dependence upon the number and the expertness of their elephants; of late they are little used, except for drawing cannon, and transporting provisions—still they are used in war in Siam, in Cochin-China, in Tonquin, and Pegu, 276—in

what manner armed and led to battle—effects of its fury in the field—those placed upon its back in a square tower, combat as from an eminence, and sling down their weapons with double force—nothing more dreadful, or more irresistible, than such moving machines, to men unacquainted with the modern arts of war—Romans quickly learned the art of opening their ranks to admit the elephant, 277—and separating it from assistance, compelled its conductors to calm the animal's fury, and to submit—sometimes, instead of obeying, turned upon those it was employed to assist; one elephant is known to consume as much as forty men in a day—they are now chiefly employed in carrying or drawing burthens throughout the peninsula of India—it can, with ease, draw more than six horses can remove—it carries upon its back three or four thousand weight; and upon its tusks it can support near a thousand—when pushed, it moves as swiftly as an horse at full gallop—it travels fifty or sixty miles a day; and hard pressed almost double that quantity—heard trotting on at a great distance, 278—its track is deeply impressed on the ground, and from fifteen to eighteen inches in diameter—used, in India, as executioners, and with what dexterity they perform the horrid task—sometimes they impale the criminal on their enormous tusks, 279—two surprising instances how sensible it is of neglect, 275—the keeper despising its endeavours in launching a ship, the animal redoubled its efforts, fractured its skull, and died upon the spot, 279—revenge one of them took upon a tailor who pricked its trunk with a needle in Deli, 280—is mindful of benefits, 279—instance of it, 280—at the Cape of Good Hope they are hunted for the sake of their teeth—in what manner—account of an unhappy huntsman, 280—teeth of the elephant found in a fossil state—two great grinding teeth, and part of the tusk of an elephant, discovered at the depth of forty-two yards in a lead mine in Flintshire—tusks of the elephants that come from Africa, seldom exceed two hundred and fifty pounds, 282—it is defeated by the rhinoceros, 287—not afraid singly to make opposition to the lion, iii. 225

Elephantiasis, or the Arabian leprosy, a disease to which man and the elephant are equally subject,—in what manner the Indians endeavour to prevent it, iv. 265

Elizabeth, (queen) her injunction upon fasting, ii. 131—in her times, the whole kingdom could not supply two thousand horses to form the cavalry, 370

Ellis, his principal experiment upon coralline substances, viii. 196

Elk, its size equal to that of the elephant, iii. 140—is an animal rather of the buck than the stag kind—known in America by the name of moose-deer—is sometimes taken in the German and Russian forests; but extremely common in North America, 140—its horns fortuitously dag up in many parts of Ireland, measuring ten feet nine inches from tip to tip—a small one, the size of an horse, and the horns little larger than those of a common stag, 141—Jocelin and Dudley describe this animal about eleven feet high; others extend their accounts to twelve and fourteen feet—never disturbs any other animal, when supplied itself—a female of this kind shewn at Paris in the year 1742—its description—they gave it thirty pounds of bread every day, besides hay; and it drank eight buckets of water, 142

American Elk, of two kinds, the grey and the black; described—they prefer cold countries, feeding upon grass in summer, and the bark of trees in winter—time and manner of hunting them, 144—its flesh very well tasted, and very nourishing—its hide strong, and so thick as to turn a musket-ball; yet is soft and pliable, 147—this animal troubled with the epilepsy—is but very indifferently and confusedly described by travellers—their various descriptions, 148—in what manner killed by the glutton, 398

Elops, or *Sea-serpent*, its description, vi. 304

Ely, an island, the country round it was once a most delightful spot, i. 279—produced grapes that afforded excellent wine—the sea breaking in, overwhelmed the whole country, 280

Emmanuel, (king of Portugal) to try the strength of the elephant and rhinoceros, made them fight, and the elephant was defeated, iv. 287

Embalming, the Egyptians carried this art to perfection, ii. 267—copious detail of this art as practised among them—in Genesis, Joseph seeing his father expire, ordered his physicians to embalm the body—various methods of embalming, 268—the art still among the Guanches, ancient inhabitants of the island of Teneriff, when the Spaniards

conquered it—particulars of their method of embalming, 272—the Peruvians also understood this art, according to Father Acofta, 274—a mummy lately dug up in France, fhews the art more completely understood in the western than the eastern world, 283

Embroidery, done in India with porcupine quills, as belts, baskets, and necessary pieces of furniture, iv. 112

Embryo, its first rudiments, ii. 39—in a month an inch long, 41—the male develops fooner than the female, 42—progress and increase of it, 40—in the human, the under jaw much advanced before the upper, 91—brain, and spinal marrow, first seen begun, 146—the bones as soft as the flesh, 193

Emigration, causes of emigrations of birds, v. 32—in what manner performed, 35

Emu, an inhabitant of the New Continent, called also the American ostrich—description and places where found—runs so swiftly, the dogs lose the pursuit, v. 64—one surrounded by hunters, the dogs avoided its rage—peculiar in hatching its young, 66—the young at first familiar—follow any person—as they grow older, become cunning and distrustful—their flesh good to be eaten—they live entirely upon grass, 67

Encoubert, of Buffon, the tatou of Ray, a shelly quadrupede, iv. 132

England, claims dominion over the seas encompassing Great Britain and Ireland, i. 232—losing its superiority upon the ocean, its safety becomes precarious, 233—late as king James I. the court still furnished with a dwarf, a giant, and a jester, ii. 251—the ass entirely lost under queen Elizabeth, 385—not infested with wolves, iii. 319—the viper the only venomous animal there, vii. 203

Enquiries most intricate generally most useless, ii. 21

Entry, a term in the chase of the stag, iii. 114

Ephemera, various kinds of this insect, vii. 361—its description, 362—colours of their aurelias, 363—their transformations, 365—places where found in abundance—short duration—their impregnation, 364

Epicure, the greatest has the most depraved taste, ii. 184

Epiphanius (St.) lived an hundred and fifteen years, ii. 132

Equator, description of the regions under it, i. 13

Ermin, its description—alike in figure to the weasel, iii.

353—its fur the most valuable of any—the time in which it is called the stoat, 354—manner of moulting its hair, 357—one ate honey, and died shortly after—proof of a distinct species from the pole-cat or the martin—one of these fed with eggs and flesh, let them putrefy before it touched either—in Siberia, taken in traps baited with flesh; and in Norway, shot with blunt arrows or taken in traps—sometimes found white in Great Britain, and is then called the white weasel—its fur among us of no value, 358—preys upon the leming, iv. 89

Erne, kind of eagle—its distinctive marks, v. 97

Eruption, of a volcano, remarkable, in 1537, i. 89—of Vesuvius, in which Pliny the naturalist was suffocated, and the city of Herculaneum was overwhelmed, 91—another, of the same mountain, in 1707, described, 91—of Cotopaxi, in 1743, described by Ulloa, 100—matter thus exploded lies a little below the bed of the mountains, in Mr. Buffon's system, 101—but supplied from the deeper regions of the earth, 103

Esculapian, serpent of Italy—its excrement a pleasing perfume, vii. 184—a domestic creature, 223

Esox, or the pike, description of this fish, 307

Esquimaux Indians described, ii. 213, *et seq.*

Evaporation, cold diminishing the force of menstruums, promotes evaporation—theory for the formation of the clouds, i. 370—prevented by moist weather—dry frost assists evaporation, 371

Evils, thousands of natural evils permitted to exist in the world, and why, i. 20

Eunuchs of two kinds, the white and the black—made in Italy to improve the voice, ii. 73—instance, in our country, of a very fine woman married to an eunuch, 74

Euphæmia, a city in Calabria, sunk by an earthquake, i. 119

Euphrates, a river, its sources, i. 211—receives eleven rivers, 217

Eurites, a city swallowed by an earthquake, i. 161

Europeans resemble our common parent more than any of the rest of his children, ii. 239—argument which suffices to prove it, 240

Eustachian tube, a passage from the ear into the mouth—its use, ii. 173

Ewe, with the buck-goat, produces an animal that in two or three generations returns to the sheep, and retains no marks of its ancient progenitor, iii. 35.

Excrements of some serpents kept as the most pleasing perfume at Calicut and Cranganon, in East-India, vii. 184.

Executioner, elephants in India used as such—impale the criminal on their tusks, iv. 279.

Exercise, manual, hares taught to go through it, iv. 9.

Exhalations, mineral, raised by subterranean heat, i. 338—when copious, every where fatal, 326.

Exocoetæ, the flying fish, its description, vi. 308.

Expedition against Carthage, in America, i. 322—and the Havannah, i. 323.

Experience, repeated, shews how seldom pains are suffered, or pleasures enjoyed, to the utmost, ii. 208.

Experiment, by Mr. Belcher, upon the circulation of the blood through the bones, ii. 194—made by approaching a looking-glass to the mouth, to discover breathing, very uncertain, 209—of a carp placed under an air-pump, vi. 167—the famous experiment of Malpighi, concerning the stigmata of the caterpillar, viii. 14.

Extraneous, or fossil shells, found in the bowels of the earth, vii. 15.

Eyes, opened by the infant the moment of its birth, ii. 54—particularly in them the passions are painted, 81—small and nearly closed, are liked in China and Japan, 77—different colours of the eye, whence they arise, 82—eyes of oxen are brown; those of sheep of a water-colour; of goats are grey; and those of most white animals are red, 83—distance between the eyes less in man than in any other animal, 84—Montaigne disliked those men who shut one eye in looking upon any object, 94—in what circumstances women with child are said to be all mouth and eyes—the lower eye-lids, in women with child, drawn downwards, 104—of all parts the animal has double, the eyes produced soonest, 145—privation of feeling and sight would misrepresent the situation and number of all things around us, 147—two contribute to distinct and extensive vision, 149—both eyes see round the object, and give it that heightened relief which no painting does attain to—in either if there be a point which has no vision, the defect is corrected by having the organ double, 150—easy experi-

ment to be convinced of it, 150—objects at a distance are rarely equal in both eyes, 157—the best eye sees objects largest—infants having their eyes less, must see objects smaller in proportion, 158—when we look at an object extremely brilliant, vision becomes indistinct, and why, 159—how far the eye can accommodate itself to darkness—remarkable instance of it in a major under king Charles I, 160—whence have arisen the small eyes of the Tartars and Chinese, 239—eastern poets compare the eyes of their mistresses to those of the gazelle—the Greeks resemble the eyes of a beautiful woman to those of a cow, iii. 72—of all animals, natives of this climate, none have an eye so beautiful as the stag, 105—that of the wolf opens slantingly upwards in the same direction with the nose, 307—of the fox placed obliquely, like those of the wolf, 324—of the civet shine in the night, 394—those of the hare placed backwards, to see behind it as it runs, and these are never wholly closed, iv. 4—peculiar advantages of smallness of the eye in the mole, 94—description of the eyes of birds of the owl kind, v. 137—in the eyes of all animals, a complete provision to shut out too much light, or to admit a sufficiency, by contraction and dilatation of the pupil, 138—those of the great Greenland whale not larger than those of an ox, vi. 194—of the snail on the points of its largest horns, vii. 20—peculiarities in the eyes of theameleon, 155—eyes of the butterfly have not all the same form—the outward coat has a lustre displaying the various colours of the rainbow—examined a little closely, it will be found to have the appearance of a multiplying-glass, viii. 35—the beetle in its worm state has no eyes, viii. 132

Eye-brows joining in the middle considered a peculiar grace by Tibullus, and by the Persians, ii. 76—Le Brun's directions, regarding the passions, place the principal expression in them, 84—such as have them most at command are the best actors, 85—the Talapoins of Siam shave the eye-brows of the children committed to their care, 96

Eye-lashes, men and apes only have them upon the upper and lower lids, all other animals want them on the lower lid, ii. 85

Eye-lids, in birds and amphibious quadrupedes, the lower lid alone has motion—fishes and insects have no eye-lids, ii. 85

F.

Face, its form the result of custom, ii. 238—a modern lady's face formed like that of Venus de Medicis, or of the sleeping Vestal, would scarce be deemed beautiful, except by the lovers of antiquity, 265

Falcon-gentil, a kind of hawk, iii. 84—it pursues the gazelles, 84—many people admire its flesh, and dress it for eating, says Belonius, v. 85—method of training up this bird, 124—falconry, much disused among us, was a principal amusement of our ancestors, 118—the falcon-gentil and the peregrine much less than the gyr-falcon, which exceeds all others in largeness—description of the gyr-falcon—a courageous and fierce bird, not fearing the eagle—it chiefly flies at the stork, the heron, and the crane, 120—is chiefly found in the northern regions, but loses neither strength nor courage, when brought into the milder climates—the falcon-gentil moults in March and sooner—the peregrine does not moult till August, 121—the common falcon is of such spirit, that, like a conqueror in a country, he keeps all in awe and subjection to his prowess, 122—youthful falcons, though depressed by captivity, will, when brought out, fly at barnacles and wild geese, 123—the falcon's pursuit of the heron, kite, or woodlark, the most delightful sport, 127—names of the falcons in use here and in other countries, 119—among the Welch; the king's falconer the fourth officer of the state; was forbid to take more than three draughts of beer from his horn; lest he should neglect his duty, v. 118

Falconers catch the kite for the purposes of training the falcon, and how, v. 144

Fallopious, the two tubular vessels perceived by him, ii. 17

Famine supported by carnivorous animals for several weeks together, 323

Fasting, queen Elizabeth enjoined her subjects to fast from flesh on Fridays and Saturdays, to favour the consumption of fish, and multiply the number of mariners, and to spare the stock of sheep, ii. 131

Fat of the chamois, its medicinal virtue—fat of animals found efficacious in some disorders, iii. 69—of the manati, exposed to the sun, has a fine smell and taste, and exceeds the fat of any sea-animal—the heat of the sun will not spoil, it nor make it rancid—several other qualities of this, iv. 185

Father-lasher, description of this fish, vi. 32

Fawn, name of the buck and the doe the first year, iii. 128

Feathers of birds described, v. 6—of the ostrich almost as soft as down, 50—different uses made of goose-feathers, vi. 122

Feather-beds utterly unknown in countries bordering on the Levant, and all Asia, vi. 123—ancients did not use feather beds—Pliny speaks of bolsters of feathers for their heads—feathers make a considerable article of commerce—different qualities—best method of curing them—old feathers more valuable than new, vi. 123

Fecundity of the rabbit greater than of the hare, iv. 16

Feeling, deprived of feeling, our eyes would misrepresent the situation and the number of all things around us, ii. 147—blind men have this sense finer than others, and why—the grossest and most useful of the senses—no total deprivation of it but with life—those parts most exercised in it, acquire the greatest accuracy—the fingers, by habit greater in the art than others, not from their having more nerves, 185—fishes having no organs for feeling, must be the most stupid of all animals—feeling, the guardian, the judge, and the examiner of all the senses, is never found to deceive, 186

Ferret, has eyes of a red colour, ii. 83—not found at present here but in the domestic state—its description—a native of the torrid zone, iii. 359—naturally such an enemy of the rabbit, that a young ferret, although unacquainted with the kind, will fiercely attack and bite even a dead one—use of ferrets in warrens to enter the holes muzzled, and drive the rabbits into the nets at the mouth, 360—to bring the ferret from his hole, straw and other substances burnt at the mouth—the female less than the male, whom she seeks with great ardour and often dies without being admitted, 361—they sleep continually, and the instant they awake seem eager for food—are usually fed with bread and milk—breed twice a year—some devour their young as soon as brought forth, and then become fit for the male again—the litter usually from five to six young; and these consist of more females than males—its scent fetid—has attacked and killed children in the cradle—is easily irritated, and then smells more offensively—its bite difficult.

of cure—has eight grinding teeth—to the ferret kind may be added an animal called by Mr. Buffon the vanfire, 362—comes originally from Africa, iv. 22

Fever, opinion that the lion is in a continual fever, iii. 224

Fewmet, name for the excrement of the stag, iii. 113

Fibres, muscular, compose the stomachs of insects, iii. 6

Fieldfare, bird of the sparrow kind, v. 314

Fielding, affirms he never knew a person with a steady glowering smile, but he found him a rogue, ii. 94

Figure, little known exactly of the proportion of the human figure, ii. 106—different opinions concerning it, 107—whence proceed the variations in the human figure, 239—the oldest measure of the human figure in the monument of Cheops, in the first pyramid of Egypt, 264

Finder, a dog of the generous kind, iii. 286

Fins, different purposes they answer in fishes, vi. 153—those of the whale—their use, 192

Fin-fish, vi. 191—its food, vii. 202

Fingers, by habit, and not from a greater number of nerves, become exacter in the art of feeling than any other part, even where sensation is more delicate and fine, ii. 185

Fire, perpetual, in the kingdom of Persia, i. 86—advantages arising from the subterranean fires, 124—put out by the sun shining upon it, and why, 333—fleeing balls of fire, 377—great globe of fire seen at Bononia in Italy, not less than a mile long and half a mile broad, 382—lighted to preserve herds and flocks from animals of the cat kind, iii. 222

Fireflare, Pliny, Ælian, and Oppian, supply the weapon of this fish with a venom affecting even the inanimate creation—reasons to doubt of it, vi. 255

Fishes petrified, found in the mountains of Castravan, i. 45—fish in abundance found in a new formed island—those who eat of them died shortly after, 126—cannot live in water, whence the air is exhausted, 316—showers of fishes first raised in the air by tempests, 390—most of them produced from the egg, ii. 26—have no eye-lids at all, 85—nor any neck, 102—are allured by music, 168—having no organs for feeling, must be stupid, 186—ruminating sort, iii. 5—opinion, that all fish are naturally of the salt element, and have mounted up into fresh water by accidental migration—some swim up rivers to deposit their spawn; of which the size is enormous, and the shoals endless—all keep

to the sea, and would expire in fresh water, vi. 151—the number to which names are given, and of the figure of which something is known, according to Linnæus, are above four hundred—their pursuits, migrations, societies, antipathies, pleasures, times of gestation, and manner of bringing forth, are all hidden in the turbulent element that protect them—the history of fishes can have little in it entertaining; for instead of studying their nature, pains have been taken to increase their catalogues, 152—that shape granted to most fishes, is imitated in such vessels as are designed to sail with the greatest swiftness—any large fish overtakes a ship in full sail, with great ease—the chief instruments in the motion of a fish are the fins—in some they are more numerous than in others—it is not always the fish with the greatest number of fins that has the swiftest motion, 153—how the fins assist the fish in rising or sinking, in turning, or leaping out of the water—all this explained by the experiment of a carp put into a large vessel, 153—all fishes covered with a slimy, glutinous matter, that defends their bodies from the immediate contact of the surrounding fluid—they fall behind terrestrial animals in their sensations—their sense of touching and smelling, 157—their sense of tasting, 158—hearing is found still more imperfect, if found at all, 159—Mr. Gouan's experiment to this purpose—from it is learned they are as deaf as mute—their sense of seeing, 160—their brain, 161—their rapacity insatiable; when out of water, and almost expiring, they greedily swallow the bait by which they were allured to destruction, 162—the maw placed next the mouth; and though possessed of no sensible heat, is endued with a faculty of digestion, contrary to the system, that the heat of the stomach is alone sufficient for digestion, 163—though for ever prowling, can suffer want of food very long—instances of it, 164—life of a fish but one scene of hostility, violence, and evasion, vi. 165—the causes of animal migrations, 166—all stand in need of air for support—those of the whale kind come to the surface of the sea every two or three minutes to breathe fresh air—experiment of a carp in a large vase of water, placed under an air-pump, 167—general method of explaining respiration in fishes, 168—the description and uses of their air-bladder, 169—full play of the gills prevented, or the bony covers kept from moving, the animal would fall into convulsions, and die, 168—some fishes

have no air bladder, 172—can live but a few minutes without air—nothing more difficult to account for, than the manner of their getting this supply, 168—no part of the account of the use of the air-bladder well supported, 170—Bacon's observations upon their growth and age—two methods for determining the age of fishes, more ingenious than certain—a carp found to be an hundred years old—the discovery confirmed by authors, 173—longevity of these animals, nothing compared to their fecundity—some multiply by millions—some bring forth their young alive, and some produce eggs—the former rather the least fruitful—the viviparous blenny brings forth two or three hundred at a time, all alive, and playing together round the parent, 175—different seasons for depositing spawn, 178—some fishes have the tenderness of birds or quadrupedes for their young, 179—their copulation as yet a doubt, 177—Apicius noted for first teaching to suffocate fish in Carthaginian pickle, 180—the flesh of fishes—question to the learned concerning the flesh of fishes, 181—cetaceous fishes, 183—cartilaginous fishes, 227—sucking-fish sticks to the shark—called the shark's pilot, and why, 242—all fish more delicate about a baited hook than their ordinary food 248—best bait for all is fresh herring cut in pieces of a proper size, 254—experience shews, the larger fish take a living small one upon the hook sooner than any other bait, 253—more than those of the ray kind possessed of the numbing quality—Condamine informs us of a fish with the powers of the torpedo, and resembling a lamprey, 263—lamprey of the English Severn the most delicate fish whatever, 266—*galley fish*, described, 289—*pipe-fish*, 285—*ump-fish*, 283—*sun-fish*, 281—spinous fishes, 298—use of it, 309—all fish of the same kind have the same number of bones, 312—the small lean, and with many fins, the most bony, 313—vulgar expression, that fishes at some seasons are more bony than at others, scarce deserves contradiction, 312—none imbibe the sea-saltiness with their food, or in respiration—whence then do some fishes live there, and quickly expire in fresh water some tribes live only in the sea; others only in fresh water; some a part of the season in one, and a part in the other, as the salmon, the shad, the smelt, and the flounder, 315—some fish, as the eel, descend the fresh-water stream, to bring forth their young in the sea—in what season, 317—long voyages undertaken by some tribes that constantly reside in the ocean, and may

be called fish of passage—stated returns and regular progress of these fish of passage the most extraordinary circumstances in the history of Nature, vi. 319—names of several migrating fishes—of all such, the herring and pilchard take the most adventurous voyages, 319—places where found in abundance, 321—manner in which the eggs of fish are impregnated wholly unknown, 332—in the islands of the Indian Ocean, an over quantity, in shoals, on the swamps, dried up by the sun—the putrefaction renders the country unhealthful—amazing propagation along our coasts and rivers not proportionate to the quantities among the islands of the Indian Ocean, 329—places where the spawn is deposited—doubts whether most fish come from the egg completely formed, 330—growth of fishes, 333—instance in the growth of the mackarel—all live upon each other in some state of their existence—of those in the ocean of the spinous kinds, the dorado the most voracious, 334—flying-fish chiefly sought by the dorado—their warfare, 335—opinion that all fishes are natives of the sea, founded upon their superior fecundity of breeding twenty to one—certainly fresh-water fishes abate of their courage and rapacity, 337 greediness of the sea-fish to devour the bait prodigious compared with the manner it is taken in fresh water—difference of baits with which they are caught, 338—some fishes rendered so torpid in the northern rivers, as to be frozen up in the masses of ice, and continue there several months, seemingly without life or sensation, waiting the approach of a warmer sun, to restore them to life and liberty—each species of fish infested with worms of different kinds, 341—most vivacious animals—often live upon substances poisonous to the more perfect classes of animated nature—numbers of fishes making poisonous wounds, scarcely to be doubted, 342—some fishes being poisonous is notorious, the cause inscrutable—Dr. Grainger, after residing many years at St. Christopher's, affirms that of fish caught at one end of the island, some were good and wholesome, while others of the same kind, taken at a different end, were dangerous and commonly fatal—the Philosophical Transactions give an account of poisonous qualities of fish at New Providence—all kinds, at different times alike dangerous; the same species this day serving as nourishment, the next found fatal—speculations and con-

jectures to which these poisonous qualities have given rise, 343

File-fish, most wonderful of the shelly tribe, vii. 65. See *Pholades*.

Fishery of pearls, several—chiefly carried on in the Persian Gulph, vii. 56—the people destined for the pearl-fisheries—they die consumptive, 58—in what manner they fish for pearls, 59

Fishing-frog, from its deformity called *sea-devil*, vi. 282—corcelt that this fish uses its two long beards or filaments for fishing—Rondelet says, that the bowels taken out, the body appears transparent; and with a lighted candle in it, has a formidable appearance—fishermen have a great regard for this ugly-fish, as an enemy to the dog-fish; when taken they set it at liberty, 283

Fissures, perpendicular, found in every field, and every quarry—their causes, i. 62

Fistularia, description of this fish, vi. 308

Flame will burn under water—none found continuing to burn without air, i. 333

Flamingo, the most remarkable of the crane kind, the tallest, bulkiest, and most beautiful, vi. 10—its description—chiefly found in America, once known on all the coasts of Europe, 10—in deserted regions, the flamingos live in a state of society, and under a better polity than others of the feathered creation—delicacy of its flesh, 11—when the first Europeans in America killed one, the rest regarded the fall in fixed astonishment; thus the fowler levelled the flock, before any began to escape—it is now one of the scarcest, and shyest birds in the world, 12—places it chiefly inhabits—always appoint one as a watch—who gives notice of danger with a voice as shrill as a trumpet, 12—negroes fond of their company, and think their society a gift of heaven, and protection from evils, 14—those killed hidden in the long grass, to prevent ill treatment from the blacks discovering the murder of their sacred birds—are frequently taken with nets; refuse all nourishment when taken; pine and die, if left to themselves in captivity—its tongue is the most celebrated delicacy, a dish of them, says Labat, is a feast for an emperor—a Roman emperor had fifteen hundred flamingos tongues served up in a dish—their tongue larger than that of any other bird—their flesh, 309—they move in rank like cranes—appear in

flight, of a bright red as a burning coal—manner of feeding very singular—savages of Canada call it *tococo*, and why, 16, 17—time of breeding and their nests, 17—number of their eggs—colour when young—they become familiar in five or six days, eat out of the hand, and drink sea-water; but generally pine away, wanting their natural supplies, and die in a short time, 19—savages make ornaments of their plumes; and the skin sometimes serves the Europeans to make mitts, 19

Flea, its description; vii. 268—it can draw a chain an hundred times heavier than itself, and eat ten times its own size of provision in one day, 248—persecutes the hare, iv. 12—Lewenhoeck has discovered above six thousand facets on the cornea of a flea, viii. 36—arborescent water-flea, or monocus, described, vii. 288

Flemings possessed the art of cloth-working in a superior degree—were invited to settle here, iii. 43

Flesh, dries at Cusco like wood, without corrupting, ii. 274—the Persians esteem that of the wild ass so highly that its delicacy is a proverb among them, 378—of the fallow deer preferred to any other, iii. 125—of the roebuck between one and two years old, allowed the greatest delicacy known, 139—of the tiger is good for food; some hold it superior to mutton, 249—of dogs sold in shambles all over China, 297—and the negroes of the coasts of Guinea esteem it a delicacy—as likewise that of toads, lizards, and tigers, 297—that of the wolf very indifferent; no creature known to eat it but the wolf himself, 323—of the squash, tolerable food, 385—that of the glutton not fit to be eaten, 402—of the hare religiously abstained from by Jews, ancient Britons, and Mahometans, iv. 14—of the paca considered a great delicacy, 254—of the tendrat, thought by the Indians a great delicacy, 107—of the pangolin considered a very great delicacy by the negroes of Africa, 121—of the armadilla, or taton, said to be delicate eating, 130—of the seal formerly found place at the tables of the great, 180—of the monkey liked by the negroes, 224—of the ostrich proscribed in scripture, unfit to be eaten, v. 53—of the emu, or the American ostrich, good to be eaten, 67—of the dodo, good and wholesome eating, 77—of the vulture, falcon, and osprey, when young, excellent food according to Belonius, 85—that of carnivorous birds stringy and ill-tasted, soon corrupting, and tinged with that

animal food upon which they subsist, 84—of the bird condor, as disagreeable as carrion, 102—of the peacock, keeps longer unputrefied than of any other animal, 173—of the pheasant, considered as the greatest dainty—of the quail, a very great delicacy, 214—that of the partridge, so valued by the French, according, to Willoughby, that no feast could be complete without it, 206—of the toucan tender and nourishing, 246—of young herons, in particular estimation in France, 398—of the bittern, greatly esteemed among the luxurious, vi. 5—of the puffin, formerly by the church allowed on lenten days, 102—of fishes, yields little nourishment, 179—question proposed to the learned concerning it, 180—of the young porpess, said to be as well tasted as veal, 224—of the shark, is hardly digestible by any but negroes, who are fond of it to distraction, 243—of the turtle is become a branch of commerce, 392—that of some crabs is poisonous, 370—of the great Mediterranean turtle sometimes poisonous, 388

Flies, torment the elephant unceasingly—arts the elephant tries to keep them off, iv. 266—the cornea so adapted by Puget, as to see objects through it with a microscope—strangeness of its representations—does the fly see objects singly, as with one eye; or is every facet a complete eye, exhibiting its object distinct from the rest viii. 36—common water-fly swims on its back, vii. 359—dragon-fly, or the libella, 316—the Spanish-fly, viii. 141. See *Cantharides*.

Flintshire, in a lead mine there, two great grinding teeth, and part of the tusk of an elephant, discovered, at the depth of forty-two yards, iv. 282

Flounder, known to produce in one season, above one million of eggs, vi. 176

Fluids, ascending in vessels emptied of air—rising in capillary tubes, and how this comes to pass, i. 192

Flumide, description of this fish, vi. 306

Flux of the sea, i. 250—not equal in the Strait of Magellan, i. 259

Fly-catcher, bird of the sparrow kind, v. 317

Flying-Fish, its description, vi. 308—chiefly sought by the dorado, 335

Fly-trap, name of a flower, closing upon the flies that light upon it, viii. 162

Fœtus, the canal of communication through which the blood circulates in the fœtus, without going through the lungs, has been found open in some bodies that have been dissected, vii. 58

Fongwahang, natives of China give a fantastic description of this imaginary bird, v. 191

Fontenelle, a celebrated writer, of a weak and delicate habit of body; the remarkable equality of his temper lengthened out his life to above an hundred; nothing could vex or make him uneasy, ii. 201

Food, man can live without it for seven days, ii. 132
—a Scotchman for the space of six weeks took no food at all, 133

Foot, hares have the sole of it furnished with hair, iv. 8.
See *Hare* and *Hair*,

Foramen ovale, opening in the heart of the fœtus, ii. 45
---in the seal's heart, never closes, iv. 171

Forbin, (Chevalier) his account of baboons forcing women in Siam, iv. 210

Forehead, narrow, liked by the Romans. ii. 76

Forest, generally divided between monkies and serpents, iv. 221

Formica-leo, the lion-ant, described, vii. 323---its habits, 324---retreat, 325---contrivances for catching other insects, 326, 327---when attaining a certain age, changes its form, 328---description when become a large and beautiful fly of the libellula kind, 330

Form of hares made in places where the colour of the grass most resembles that of their skin; is open to the south in winter, and to the north in summer, iv. 9---they sleep or repose in them, by day, iv. 7

Fossile, teeth of elephants often found in that state, iv. 282---bones found in Peru and Brazil, 283---shells in the bowels of the earth, not found in the ocean, vii. 15

Fouine, animal of the weasel kind, iii. 368

Fowls, large, do not rise easily, and why, v. 8---few water-fowls known to breed in England, and why, 33---those of reddish plumage the ancients held invaluable; the white, as unfit for domestic purposes, and fit as prey to rapacious birds---Aristotle thinks them less fruitful than the former, 162---sea-fowls ever sporting on formidable sea-coasts, vi. 78

—general characteristics of water fowls, 45, 46—their food, 48—the gull kind, 49—the penguin kind—the goose kind, 49—water-fowls properly of no climate, 106

Foxes, their cubs born blind, like those of the dog, iii. 331—the fox lives about twelve or fourteen years—remarkable instance of parental affection of a she-fox, 330—all animals make war upon the fox—even the birds, 331—refuses to engender with the dog—brings forth fewer than the dog, and but once a year, 329—the female goes with young six weeks, and seldom stirs out while pregnant, 330—various colours of them—three varieties of this animal in Great-Britain; grey-hound fox, mastiff-fox, and cur-fox—round the pole they are of all colours, 332—jackall taken for the fox—skin of the black fox most esteemed, a single skin selling for forty or fifty crowns, 333—in Greenland do not change colour at all, 356—taken young, are gentle only while cubs, growing older, discover their natural appetites of rapine and cruelty, 277—nothing eatable comes amiss to them, rats, mice, serpents, toads, and lizards; insects, crabs, shrimps, and shell-fish; carrots, wax, and honey, even the hedge-hog, 327—often takes possession of the hole quitted by the badger, or forces it from its retreat by art, iv. 328—hunt in packs, 276—chace of the fox, iii. 328—their offensive smell often the cause of their death, 324—way they find to subsist, 325 to 327—name given by huntsmen to a fox of the second year—old fox the name for the third year, 328—many animals in this country bred between a dog and a fox, iii. 298—experiments prove neither the wolf nor the fox of the same nature with the dog, each a species perfectly distinct, 298—exactly resembles the wolf and the dog internally, 323—description; eyes, obliquely situated, like the wolf, 324

Fox (cross'd.) name of the *isatis*, when turning white, iii. 341

Fox-tailed monkey, of the *sagoin* kind, iv. 237

France, its kings of the first race had whiskers knotted and buttoned with gold, ii. 97—under Francis I. peacocks served at the tables of the great, not to be eaten but seen, v. 173

Frey, said when stags rub off the peel of their horns against trees, iii. 114

Frederic, emperor of Germany, wrote a treatise upon hawking, v. 118

Frederickshall, Charles XII. shot at the siege of that fortress, ii. 208

Frisland, great inundations happened in it, i. 278

Frischebaff, a lake where the sturgeon is found in greatest numbers, vi. 273

Frog, differences between it and the toad, in figure and conformation, vii. 74—the frog the best swimmer of all four-footed animals, 75—its description—male or female have no external instruments of generation; the anus serving for that purpose in both, 75, 76—coupling of the common brown frog—experiments to discover how their impregnation is performed, 76—the female not impregnated by the mouth, as conjectured, nor by the thumbs, as imagined by Linnaeus, but by insersion of male seminal fluid upon the eggs proceeding from the body—how the female brings forth eggs, 80—various changes in the eggs after impregnation by the male, 81—the animal in its perfect state, from feeding upon vegetables, becomes carnivorous, lives upon worms and insects, and seeks for food upon land—myriads seen on such occasions, have been fancied to be generated in the clouds, and showered down on earth, 83—their habitudes and food, 84—differences of sexes not perceivable, until their fourth year; do not begin to propagate till that period, 84—live about twelve years, vii. 85—a German surgeon kept one eight years in a glass covered with a net, fed it often but sparingly—instances of tenaciousness of life, 86—the male only croaks—large water-frog's note as loud as the bellowing of a bull; and heard at three miles distance—times of their croaking—no weather-glass so true in fore-telling changes, 87—adhere to the backs of fishes, 88—story of Walton to this purpose, 89—dry weather hurtful to frogs, 88—designedly introduced into Ireland before the Norway rat, iv. 66—the rat put a stop to their increase; and the frog is almost extinct in that kingdom, 67. See *Fishing-frog*.

Frost, dry, augments evaporation, i. 371

Frost-smoke, fogs near the pole form halos, or luminous circles, i. 386, 387

Froth-worm, its description, vii. 358

Fumes of hot iron, copper, or other metal, blown into the place where an animal is confined, instantly destroys it, i. 319

Fur, the colder the country, the larger and the warmer the fur---instances of it, ii. 329---of the white fox not esteemed, and why, 333---the status of no value, unless killed in winter, 341---the ermine the most valuable of any, 354---no easy matter to account for warmth of furs of Northern quadrupedes, or how they come to have such abundant covering---particulars on this subject, 355---white weasel, found in Great-Britain, of no value, 358---ermine, in every country, changes by time, 359---of the polecat in less estimation than some of inferior kinds, 366---of the yellow-breasted martin more valuable and beautiful than the white, 368---different colours of the sable, 374---of the genet valuable, iii. 388---of the glutton has the most beautiful lustre, and is preferred to all except the Siberian sable, 403---of the hare forms a considerable article in the hat manufacture, iv. 13---of the cricetus, or German rat, very valuable, 84---inside down of the vulture's wing makes a warm and comfortable kind of fur, v. 109---of the civet, impregnated with the perfume, iii. 392

G.

Gadfly, formidable in Lapland---brings on an incurable disorder upon the rein-deer---precautions used against them, iii. 157

Gadus, the cod-fish, its description, vi. 306

Gaganda, island of Ethiopia, parrots found there by the Romans, v. 284

Galam, a place nine hundred miles up the Senegal, taken from the French, i. 212

Galen, asserts the eggs of hens and pheasants good to be eaten, those of geese and ostriches worst of all, v. 63

Galinaffer, Spanish name of vultures in America, v. 113

Gall, the deer kind have none, iii. 94---of the shammy held useful to strengthen the skin, 69

Gall-nuts, description of the insect forming and residing in them, and its transformations, viii. 148

Galley-fish, its description, vi. 289---its legs adhesive---common in America, perpetually floating; no efforts made to hurt can make it sink---never perceived to move on shore, so strongly adhering to whatever substances applied, 290---the smallest quantity of slimy substance from its legs burns the skin like hot oil---the shore covered with them, a sort-runner of a storm, 291

Gally-worm, its difference from the scolopendra, vii. 303

Game, sanguinary laws to preserve it, iii. 110

Ganges, a river visited annually by a hundred thousand pilgrims, who pay their devotions to it as to God, i. 211—
in its course receives twenty rivers, 217

Gannet, the soland goose, its description—subsists upon fish—places abounding with them, vi. 71—manner of preserving them and their eggs, in the island of St. Kilda; twenty-three thousand of this kind of young birds consumed annually there—a bird of passage—its migrations; never comes near the land, 73—where seen, it announces the arrival of herrings—exceeds the cormorant in quickness of fight—method of taking its prey—manner of taking them at sea, vi. 74—number of their eggs—their young counted a great dainty, and sold very dear, 75

Garter-fish, the lipidopus, its description, vi. 306

Gasterosteus, or the stickleback, description of this fish, vi. 303

Gazelles, neither goat nor deer—partake of both natures, iii. 70—they form a distinct kind, iii. 71—their description, 70—of all animals it has the most beautiful eye—eastern poets compare the eyes of their mistresses to those of the gazelle, 72—Buffon makes but twelve varieties—their names and descriptions, 73—comparing them together, we find but slight distinctions, 83—are inhabitants of the warmer climates—no animals, but of the winged kind, can overtake them—are pursued by falcons; and this hunting is a principal amusement among the great in the East, 84—also hunted with the ounce, 85—another way of taking them, 86—keep in solitary and inaccessible places, 87—the bubalus, more properly one of Africa, 149—the most usual prey for the lion in deserts and forests, 223—the prey of the panther, 260—pursued by the jackall, makes towards houses and towns, 337—

Gekko, a kind of salamander, vii. 141

Generation, most complect where fewest animals are produced, ii. 48—late discovery, that male fishes have two organs of generation, vi. 175—all animals of the snail kind are hermaphrodites; each containing the instruments of generation double, vii. 30—these organs in the muscle, 42—male or female of frogs have no external instruments for that use, 76

Genet, its odour more faint than civet—description of this animal—resembles the martin; more easily tamed; Bellonius has seen them at Constantinople tame as cats—glands open differently from others of its kind, iii. 386—called the cat of Constantinople—never found in mountains, nor dry places—its fur valuable—species not much diffused countries where it is found—the most beautiful, cleanly, and industrious animal—keeps a house free from mice and rats by its smell, 388

Genet, of the province of Andalusia the best, ii. 357

Georgians their description, ii. 230

Gerbua, has four feet, uses only the hinder in running or resting, iv. 349—the swiftest creature in the world—description—countries where found—lives upon vegetables, and burrow like rabbits, 349—its habits, 351

Gerenda, a serpent to which the natives of Calicut and those of the Mozambique coast pay divine honours, vii. 224

Germany, the meanest peasant kills a cow for his table, salts and hangs it up, and preserves it as a delicacy all the year round, iii. 9

Gfner, minutely describes a variety of mouse-traps, vi. 74—places bats among birds, iv. 134

Giant, in England, as late as king James I. the court had one, ii. 251

Giants, probability of the race affirmed, possibility of their existence denied—Grew's opinion, ii. 258—Ferdinand Magellan, a Portuguese, first discovered a race of such people, towards the extreme coast of South America, 259—assent to the existence of this gigantic race of mankind, 262—travellers confirm it, 261—seen here, have the same defects of understanding as dwarfs—are heavy, phlegmatic, stupid, and inclined to sadness, 263

Gibbon, the long-armed ape, its description, iv. 206

Gills, their free play prevented, the animal falls into convulsions and dies, vi. 168

Giltbead, called dolphin by sailors—its description, vi. 300

Gimmerro, imagined a breed between an afs and a bull, ii. 386

Glands, furnish the fetid substances in animals of the weasel kind, iii. 352—of the genet open differently from others, 387—unctuous in birds to preserve their feathers, v. 4—salivary in the gullet and crop of birds, 15

Glass, a looking-glass held to the mouth of a person supposed dead, an uncertain experiment for determining latent life, ii. 209

Glitters, little impressions so called in the heads of stags, iii. 114

Globe of fire rising from the side of the mountain Pichipca, i. 381—a great one seen at Bononia, in Italy, in the year 1676—past westward at a rate of a hundred and sixty miles in a minute—could not be less than a mile long, and half a mile broad, 382

Globe of glass, filled with water, assumes successively all the colours of the rainbow, i. 385

Gloucester, its corporation had an old custom annually to present the king with a lamprey pye, vi. 273

Glow-worm, male and female of this species differ entirely from each other, viii. 140—how and in what manner in which light sent forth by the glow-worm is produced, hitherto inexplicable—the light continues to grow paler, and at last is totally extinct, if the worm be kept for some time, 141

Glue, made of the horns of the rein-deer, iii. 167—Mr. Jackson found out a method of making glue to answer the purposes of isinglass, vi. 279

Glutton, the most dangerous, and most successful persecutor of the rein-deer, iii. 169—its manner of killing that deer, 170—belongs to the weasel kind—there is no precise description, of it; some resembling it to the badger, some to a fox, others to a hyæna—one brought alive from Siberia was three feet long, and about a foot and an half high, 395—so called from its voracious appetite—countries where found—called *carcajou* in North America—general description—Ray and others doubt of its existence, 396—takes its prey by surprise, and in what manner—darts down from branches of trees upon the elk, or the rein-deer, sticks its claws between their shoulders, and remains there firm, eating their necks, and digging to the great blood-vessels that lie on that part, 397—amazing quantity one of these animals can eat at a time; that seen by Mr. Kelin, without exercise or air, taken from its native climate, and enjoying but indifferent health, eat thirteen pounds of flesh every day, and was not satisfied, 399—it continues eating and sleeping till its prey, bones and all, be devoured—prefers putrid flesh to that newly killed—it is so slow that any quadruped can escape

it, except the beaver—pursues it upon land, but the beaver taking water, the glutton has no chance to succeed, 400—called the vulture of the quadrupedes—in what manner it makes up by stratagem the defects of nature, 401—the female goes with young four months, and brings forth two or three, 402—the male and female equally resolute in defence of their young—is difficult to be skinned, 403—does not fear man, 402—is a solitary animal, and never in company but with its female; couples in the midst of winter—the flesh not fit to be eaten—the fur has the most beautiful lustre, and preferred to all, except the Siberian fox, or the sable, 402

Gnats, in Lapland, fill the air like clouds of dust—are chiefly enemies to the rein-deer—remedies used against them, iii. 156—proceed from a little worm, usually seen at the bottom of standing waters—curious manner in which the eggs are laid—in their egg state it resembles a buoy, fixed by an anchor, viii. 152—different states of the insect—in its last transformation, divested of a second skin; in the next it resigns its eyes, its antennæ, and its tail; and seems to expire; from the spoils of the amphibious animal appears a little winged insect, whose structure is an object of admiration, 153—description of this insect, and of its trunk, justly deemed one of Nature's master-pieces—implement with which the gnat performs its work in summer, 154—places where it spends the winter—the little brood so numerous, that the water is tinged with the colour of the species, 155—some gnats oviparous, others viviparous, and come forth in a perfect form; some are males, and unite with the female; some are females, requiring the male; others are of neither sex, and produce young, without copulation—at the sixth generation their propagation stops, the gnat no longer reproduces its likeness, but requires the male to renew its fecundity, 156—produced in multitudes beyond expression in America; and found of all sizes, from six inches long, to a minuteness beyond the perception of the common eye—native Indians, anointed with oil, sleep in cottages covered with thousands of gnats, and have not their slumbers interrupted by these cruel devourers, viii. 157

Goat, its eyes are grey, ii. 83—from Europe imported into South America, soon degenerates; as it grows less, it becomes more prolific—imported to the African coast, it seems to improve, ii. 334—*African wild goat* of *Grimm*, ii.

fourth anomalous of the kind—its description, iii. 81—goat and sheep propagate together; and may be considered as of one family—the buck goat produces with the ewe an animal, in two or three generations returning to the sheep; and retaining no marks of its ancient progenitor, 35—more fitted for a life of savage liberty than the sheep, iii. 52—it is not easily confined to its flock, but chuses its own pasture, and loves to stray from the rest—delights in climbing precipices—is capricious and vagrant—is not terrified at storms, or incommoded by rain, immoderate cold affects it, and produces a vertigo, to which this animal is subject, 53—proof of its being naturally the friend of man, and that it seldom resumes its forest wildness, when once reduced into the state of servitude, 54—in some places they bear twice a year, 55—in warmer climates generally bring forth three, four, and five at once, 54—milk of goats medicinal; not apt to curdle in the stomach, 55—flesh of the goat, properly prepared, ranked by some not inferior to venison, 56—is never so good and so sweet, in our climate, as mutton, 57—no man can attend above fifty goats at a time, 56—flesh of the goat found to improve between the tropics—remarkable varieties in this kind; that of Natolia, by Mr. Buffon called *goat of Angora*—its description, 57—*Affyrian goat* of Gesner—chiefly kept about Aleppo—*little goat of America*, the size of a kid—has hair as long as the ordinary breed, 58—*Juda goat*, not larger than a hare—common in Guinea, Angola, and the coast of Africa—*blue goat* at the cape of Good Hope—its description, 59—*Bezoar goat*, the *pasan*, found in the mountains of Egypt, &c. 74—in Syria remarkable for their fine, glossy, long, soft hair, iii. 212—goats eat four hundred and forty-nine plants, and reject a hundred and twenty-six, 176—boundaries between the goat and deer-kind difficult to fix, 70

Goat-sucker, a nocturnal swallow—description and habits, v. 346

Gobius, the gudgeon, description of this fish, vi. 302

Godignus, in his history of Abyssinia, exaggerates the effects of the shock of the torpedo, to an incredible degree, vi. 262

Godwit, its dimensions, vi. 23—a bird of passage, vi. 23

Goiam, kingdom, where the Nile takes its rise, i. 213

Gold, never contracts rust, and why—except in places where much salt is used, i. 313

Golden-eye, bird of the duck-kind, vi. 128

Goldfinch, bird of the sparrow-kind, v. 314—learns a song from the nightingale, 345

Goose, marks of the goose kind, vi. 106—food, 108—abstained from by the ancients as indigestible, 109—one known to live an hundred years, 117—marks of the tame and wild sort—wild supposed to breed in the northern parts of Europe, 119—flight regularly arranged, 120

Brent-goose, vi. 121—most harmless, but for their young pursue dogs and men, 122—use of its feathers in beds unknown in countries of the Levant and Asia—feathers a considerable article of commerce—different qualities of them, 123—the best method of curing them, 124

Soland-goose, described, vi. 71. See *Gannet*.

Goosander, a round-billed water fowl, its description—feeds upon fish, vi. 104

Gordian, the emperour, wrote a poem upon the halcyon, of which are no remains, vi. 142

Goats-hawk, of the baser race of hawks, v. 119—taught to fly at game, little obtained from its efforts, 131

Gottinburgh, in Sweden, a cataract near it, i. 222

Gouan, a learned Frenchman, his system deserves applause for more than its novelty—how followed in arranging the spinous class of fishes, vi. 297

Graaf, his observations upon the progress and increase of animals in the womb, ii. 36, *et seq.*

Grampus, fierce and desperate in defence of its young—remarkable instance, vi. 185—description, and habits, 218

Grashopper, a ruminating insect, or seemingly so, iii. 6—differences between ours and the *cicada* of the ancients, vii. 331—great varieties of this animal in shape and colour, 332—description of the little grasshopper, that breeds plentifully in meadows, and continues chirping thro' the summer—the male of this tribe only vocal, 332—how their fecundation is performed—the male or female never survive the winter—their eggs, 334—from first appearing, possessed of wings, 337—how it gets rid of the outer skin, 338—their food, 339—places where they deposit their eggs, 340

Grave, the greatest care recommended not to commit those dearest to us to the grave, before real signs of certain death be ascertained, ii. 210

Gresatah, river in Yorkshire running under ground, and rising again, i. 224

Grube, description of the bird—residence, and habits, vi. 40—perpetually diving, and very difficult to be shot—never seen on land—chiefly sought for the skin of its breast, and why—in breeding-time their breasts are bare, 41

Greenfinch, bird of the sparrow-kind, v. 315

Greenland, Krantz's account of the formation of ice-mountains in that country, i. 246—*aurora borealis*, its appearance almost constant in winter—the inhabitants not entirely forsaken in the midst of their tedious night; this *aurora* affording them light for the purposes of existence, 387—they live mostly upon seals—their number daily diminishing, and why, iv. 182

Greenlanders described, ii. 213—customary among them to turn Europeans into ridicule, 216—a quiet, or a modest stranger, they deem almost as well bred as a Greenlander, 217

Grew, his opinion concerning dwarfs and giants, ii. 258

Greyhound-kind, iii. 284—*grey-bound fox*, 332

Gris, the *petit gris* Mr. Buffon's name for the grey Virginian squirrel, iv. 25

Grosbeak, bird of the sparrow-kind, v. 315

Grotto of Antiparos, in the Archipelago, the most remarkable subterraneous cavern now known, i. 67—description, 67

Grotto del Cant, near Naples, situation and description—noxious effects, i. 84

Grous, chiefly found in heathy mountains and piny forests, v. 199

Growth of the child less every year, till the time of puberty, when it starts of a sudden, ii. 60—growth of the mind in children corresponds with that of the body, and why, 61—of some young people ceases at fourteen, or fifteen; of others continues till two or three and twenty, 79—of fishes irregular and tardy, vi. 333

Guadalquivir, river in Spain buried in the sands, i. 224

Guanacois, a kind of camel in America, iv. 317

Guanchis, ancient inhabitants of the island of Teneriff—art of embalming still preserved among them, when the Spaniards conquered the island, ii. 272

Guariba, Brazilian guariba, or warine, the largest of the monkey kind in America, described, iv. 236

Guayaquil, river in South America, i. 147

Gudgeon, fresh-water sort has no bladder, vi. 170—description of that fish, 302

Guiba, animal resembling the gazelle—its description, iii. 81

Guillemot, bird of the smaller tribe of the penguin kind, vi. 99

Guinea, the natives kill numbers of hares at a time, and in what manner, iv. 14

Guinea-ass, larger and more beautiful than the horse, ii. 385

Guinea hen, described, v. 192

Guinea-horse, remarkable sports with it among the grandes of that country, ii. 363

Guinea pig, by Brisson placed among the rabbit-kind—native of the warmer climates—rendered domestic, and now become common every where—its description, iv. 55—in some places a principal favourite; often displacing the lap-dog, 54—manner of living among us, 57—most helpless and inoffensive, scarce possessed of any courage, 56—their animosity exerted against each other; often fight obstinately, and the stronger destroys the weaker—no natural instinct, the female sees her young destroyed without attempting to protect them—suffer themselves to be devoured by cats, 57—fed upon recent vegetables, they seldom drink—sometimes gnaw clothes, paper, or other things of the kind—drink by lapping—confined in a room, seldom cross the floor, but keep along the wall—never move abreast together—chiefly seek the most intricate retreats, and venture only when all interruption is removed, like the rabbits, 8—in cold weather more active—a very cleanly animal—their place must be regularly cleaned, and a new bed of hay provided for them once a week—the young falling into the dirt, or other ways discomposed, the female takes an aversion to them, and never permits them to visit her more—her employment, and that of the male, consists

in smoothing their skins, disposing their hair, and improving its gloss—and take this office by turns—do the same to to their young, and bite them when refractory—reared without any artificial heat, 59—no keeping them from fire in winter if once permitted to approach it—manner of sleeping—the male and the female watch one another by turns—generally capable of coupling at six weeks old—time of their gestation—the female brings forth from three to five at a time; not without pain, 60—the female admits the male the very day she has brought forth, and again becomes pregnant—suckles her young about twelve or fifteen days, and suffers the young of others, though older, to drain her, to the disadvantage of her own—produced with eyes open, and in twelve hours, equal to the dam in agility—capable of feeding upon vegetables from the beginning—their disputes for the warmest place, or most agreeable food—manner of fighting, 61—flesh indifferent food—difficulty tamed; suffer no approaches but of the person who breeds them—manner of eating—drink seldom, and make water often—grunt like a young pig—appear to chew the cud, 62

Guinea-sheep, have a kind of dewlap under the chin—breed with other sheep, therefore not animals of another kind, iii. 48

Guiratemga name given by the natives of Brazil, to the little wood-pecker, v. 255

Gull, places where found in plenty—their food, vi. 77

Gulls, various ways of imposing upon each other, vi. 80—contests in breeding—residence, with their nests and eggs, 80—their flesh—method of taking them in the Feroë islands 81—anciently a law in Norway concerning those who died in taking them, 81

Gulph, the Persian—deadly wind along its coasts, i. 358 chief pearl-fishery carried on there, vii. 56—

Cavern of Pluto, a dreadful cavern, i. 61

Gun, wind-gun, instrument determining the elasticity of the air—a ball from it pierces a thick board, i. 307—great guns, in climates near the equator, with every precaution, after some years become useless, and why, 313

Gunpowder, readily fires with a spark, not with the flame, i. 83—will not go off in an exhausted receiver; a train of gunpowder laid, one part in open air, the other part in vacuo, the latter will remain untouched, 333

Gurnard, description of this fish, vi. 303

Gustavus Adolphus attempted in vain to form a regiment of Laplanders, ii. 215

Guts, most birds have two blind guts, which in quadrupeds are found single, v. 16

Gymnotus, the *carapo*, description of this fish, vi. 306

Gyr-falcon, exceeds all others in largeness of size—its description, v. 120

Gyrle, name given by hunters to the roebuck, the second year, iii. 336

H.

Habit contracted during life, to make out pleasures and pains in extremes, though either can hardly be suffered or enjoyed to the utmost, ii. 208

Haddock, a periodical shoal appeared on the Yorkshire coasts, on December 10, 1766, and exactly on the same day in the following year, vi. 320

Hæmorrhoids, a kind of serpent, vii. 215

Hail, Cartesians say, is a frozen cloud half-melted and frozen again in its descent, i. 373—the most injurious meteor known in our climate, 374—hail stones fourteen inches round—struck out an eye of a young man, and killed him on the spot, 375—a dreadful shower recorded by Mezeray, fell in 1510; the hail-stones were of a blueish colour, and some weighed an hundred pounds—the fishes were great sufferers in that general calamity, 376

Hair of the Roman ladies praised for the redness of its shade, ii. 76—found most different in different climates—marks the country and the disposition of the man—by the ancients held a sort of excrement, produced like the nails, 86—according to moderns, every hair lives, receives nutriment, fills, and distends, like other parts of the body—takes colour from the juices flowing through it—each, viewed with a microscope, consists of five or six lesser, wrapped up in one common covering, and sends forth branches at the joints—suitable to the size or shape of the pore through which it issues—bulbous at the root, and its end resembles a brush—length and strength of hair a mark of a good constitution, 88—Americans and the Asiatics have it thick, black, straight, and shining—inhabitants of the torrid climates of Africa have it black, short, and woolly—the people of Scandinavia have it red, long, and curled, 87—opinion that

every man has dispositions resembling those of the inhabitants of countries he resembles in the colour and nature of his hair—curled hair among us a beauty—the Greeks have taken one of their national distinctions from the length and straightness of the hair, 88—Americans take the greatest pains in cutting their hair—variety in customs and manner of cutting hair, 95—trade of the inhabitants of Angora with the hair of animals of their country—camlet and other stuffs made of it, iii. 58—hair of the cat rubbed in the dark sends forth shining sparks, 207—Syria and Persia noted for long soft hair to the animals bred in them, 212—each hair of the lynx is of three different colours, 257—of the black fox so disposed as impossible to tell which way the grain lies, 333—coats of hair seem to thicken at the approach of winter—among quadrupedes, as among men, thin spair diet produces hair, 355—on the soles of the feet, and on the inside of the mouths of hares, iv. 8

Halcyon, rapacious water-fowl, vi. 140. See *King fisher*.

Halley, Dr. his plausible theory to explain the invariable motion of the winds, i. 343

Hallontide, in 1580, an army of mice so over-run the marshes near Southminster, that they eat up the grass to the roots, v. 146

Halos, oftener seen in countries near the poles, than any other part of the earth, i. 387

Hammer, the yellow, bird of the sparrow-kind, v. 315

Hamster, the cricetus or German rat of Mr. Buffon, iv. 81

Hand, sufficient to vindicate the dominion of man, over other animals, a poor assertion, iv. 249—a man, without hands or legs, converts his stumps to most convenient purposes, and performs astonishing feats of dexterity, 250

Harbour of a stag, in covert or thicket, iii. 114

Hare, a gregarious animal, where it has no enemies but beasts of the forests, iii. 2—the swiftest animal for the time it continues to run, iv. 1—animals of the hare-kind inoffensive and timorous—placed by Pyerius among those that chew the cud—whether or not, certainly the lips continually move sleeping or waking—that kind remarkably salacious, and furnished by nature with ampler powers than others for propagation, 3—if not thinned by constant depredations, would over-run the earth, of these, the hare the largest and most timorous—has large prominent eyes placed backwards to

see behind as it runs—these never closed; it sleeps with them open—the ears moveable, and capable of direction to every quarter—muscles of its body strong and without fat—hinder feet longer than the fore on account of speed, 4—persecuted by dogs, cats, weasels, and birds of prey—in a state of engendering very early—females go with young thirty days, and bring forth three or four at a time, 5—has young of different ages in her womb together—though already impregnated, she admits the male, and receives a second impregnation—reason of this extraordinary circumstance—the young brought forth with their eyes open—the dam suckles them twenty days, 6—food they are fond of—sleep or repose in their form by day, and live only by night—the rutting season begins in February—the male pursues and discovers the female by the sagacity of its nose, 7—the slightest breeze, or falling of a leaf, disturbs their revels; they instantly fly off, each taking a separate way—are more easily taken than the fox, a much slower animal than they, and why—always choose to run up hill, and why—have the sole of the foot furnished with hair, and seem the only animals with hair on the inside of the mouth—live seven or eight years, and come to perfection in one year—females live longer, 8—Mr. Buffon makes a doubt of it—seldom heard to cry, except when seized or wounded—they cry nearly alike the squalling of a child—are easily tamed—though never so young, regain their native freedom at the first opportunity—have a good ear, and been taught to beat the drum, dance to measure, and go through manual exercise—make themselves a form where the colour of the grass resembles that of their skin, open to the south in winter, and to the north in summer, iv. 9—sore hunted, will start a fresh hare and squat in its form—some enter holes like the rabbit, by hunters termed going to vault, 10—as it tires, treads heavier, and its scent is stronger—young hares tread heavier than old—male makes doublings of greater compass than the female—divided by hunters into mountain and meased hares, 11—mode of expression, the more you hunt, the more hares you shall have, and why—what animals persecute the hare—its enemies so various, that it seldom reaches the short term limited to it by Nature, 12—in countries near the north pole, they become white, and are often in great troops of four or five hundred—their skins sold for less than seven shillings an hundred—the fur known to form a considerable article in the hat manu-

factu
the f
those
the b
the t
kill
Brito
mal,
distin
Apic
taste,
Ha
noctu
Ha
Ha
Ha
porta
with
Ha
the s
Ha
great
Ha
—a d
Ha
Ha
severa
Ha
anima
Ha
y. 26
emu
croco
Ha
called
Ha
place
of the
Ha
Ha
birds,
no pe

facture—found also entirely black, in much less quantity than the former—some have been seen with horns, but rarely—those in hot countries smaller than ours—those in Milanese the best in Europe—scarce a country where not found, from the torrid zone to the polar circle, 13—natives of Guinea kill numbers at a time; in what manner—the Jews, ancient Britons, and Mahometans all considered it an unclean animal, and religiously abstained from it, 14—hare and rabbit distinct kinds, refuse to mix with each other—an instance—Apicius shews the manner of dressing a hare in true Roman taste, 15—laws made for the preservation of them, 16—*Harfang*, or great Hudson's Bay owl, the largest of the nocturnal tribe, v. 141

Harlequin, a kind of dog, iii. 286

Harmony of our planetary system, i. 4

Harold, afterwards king of England, went on a most important embassy into Normandy, and was drawn in bas-relief, with a bird on his skirt, and a dog under his arm, v. 118

Harp, the story of Arion's gathering the dolphins about the ship, ii. 168

Harpies, that ancient idea taken from the rousette, or the great bat of Madagascar, iv. 141

Harrier, hoand, and beagle, all of the same kind, iii. 283—a dog of the generous kind, 286

Hart, name of the stag the sixth year, iii. 113

Hartsborn, and musk, the only medicines of reputation of several procurable from quadrupedes, iii. 69

Harvey, his opinion about the formation of the incipient animal—altercations against his system, ii. 17

Hatching, nothing exceeds the patience of birds hatching, v. 26—Mr. Addison's observations to this purpose, 27—the emu very peculiar in the hatching of its young, 66—the crocodile's eggs hatched in the sand, vii. 134

Hatfield, in Yorkshire; description of one of those spouts called typhons, observed there in 1687, i. 394

Havannah, in the fortunate expedition which gave us that place, the climate left not a fifth part of the army survivors of the victory, i. 323

Hawfinch, a bird of the sparrow-kind, v. 317

Hawk-kind, distinctive marks from other carnivorous birds, v. 83—in old paintings, the criterion of nobility; no person of rank stirred out without his hawk on his arm, on an

important embassy into Normandy, is drawn in an old bas-relief, embarking with an hawk on his fist, and a dog under his arm—in those days, it was sufficient for noblemen's sons to wind the horn and carry the hawk fair—this diversion in such high esteem among the great all over Europe, that Frederic, emperor of Germany, wrote a treatise upon hawking, 118—this amusement now much given over in this kingdom, and why, 117—in the reign of James I. Sir Thomas Monson gave a thousand pounds for a cast of hawks—in the reign of Edward III. it was made felony to steal a hawk, 118—to take its eggs was punished by imprisonment for a year and a day, with a fine at the king's pleasure—in the reign of Elizabeth, the imprisonment reduced to three months, the offender to lie in prison till he got security for his good behaviour during seven years—in earlier times, the art of gunning was but little used, and the hawk was then valuable for its affording diversion and procuring delicacies for the table not otherwise to be obtained, 119—distinctive marks of the tribe called the long-winged hawks—their names and descriptions—have attachment to their feeder, and docility the baser race are strangers to, 119—names of hawks of the baser race—these of the generous breed remarkable for courage, swiftness, and docility, in obeying the commands and the signs of their master, 122—account of the manner of training a hawk, 124—falconers had a language peculiar, in which they conversed and wrote, 123—hawk destroys mice, iv. 73—perceives a lark at a distance which neither men nor dogs could spy, v. 10

Sparrow-hawk, pursues the thrush and the linnet, v. 81—said to be the boldest and best of all others for the chase, 131

Goshawk, and sparrow-hawk unfit for training—taught to fly at game, but little obtained from them, v. 130

Hawkins, becalmed about the islands of Azores for six months, saw the sea replenished with gellies, and forms of serpents, adders, and snakes, in a wonderful manner, i. 239

Head of a man externally and internally different from that of all other animals, the monkey-kind excepted, ii. 101—whence originally the flat heads of the American Indians, 239—of quadrupedes different from each other, but adapted to their several ways of living, and how, 314—in all birds, except nocturnal, the head smaller and less proportioned to the body than in quadrupedes, v. 9—of the great Greenland whale makes a third of its bulk, vi. 192

Hearing, extreme delicacy of this sense in birds, v. 11—
that sense in whales, vi. 194

Hearse, name of the female of the stag, the second year,
iii. 113

Heart, a broken heart, in common language; a disorder
caused by hunger, ii. 129

Heat, Boerhaave considered it so prejudicial to health,
that he never went near a fire, i. 325—of the blood in man
and other animals about thirty degrees above congelation—
in the marmout; and other animals, which sleep the winter,
it is not above ten, iv. 45

Hecla, the bellowings of that volcano, believed by the
inhabitants of Iceland to be the cries of damned, i. 88

Hedge-bog, the most harmless of animals, iv. 100—its
description, iv. 101—usual appearance upon the approach
of danger, 102---to disgust its enemy from pursuit, sheds
its urine, the smell of which is sufficient to send him off---
sleeps by day, and ventures out by night—places where
found---its food---does not suck cattle, 103---are not hurt-
ful in gardens or orchards---the spines so disposed, that no
fruit will stick upon them---appears serviceable in ridding
the field of insects and worms---Mr. Buffon accuses it of
tricks, of which, from its form and habits, one would not
be led to suspect it, 104---he kept males and females to-
gether, but they never coupled---time of their coupling---
sleep during winter, but do not lay up provisions for that
season---at no time eat much, and remain long without
food---blood cold, and their flesh not good for food---their
skins converted to no use, except to muzzle calves from
sucking, 105---destroyed and devoured by the fox---in what
manner, iii. 327, iv. 121.

Hedge-bog of the sea, a cartilaginous fish of the sea-orb
kind, vi. 287.

Hedge-sparrow, a slender billed bird, v. 314

Height, Maximin, the emperor, above nine feet in sta-
ture, ii. 118

Helicogabolus, noted for having the brains of six hundred
ostriches dressed in one dish, v. 59

Hellsbore, a quantity of the black sort pounded carelessly
purged several persons who were present, and the operator
strongly, i. 326

St. Helmo's fire, or the mariner's light, i. 380

Helmont, his experiment to show all things made of water, i. 166

Hemisphere, half illuminated by northern lights, i. 377

Hemlock, eat by the horse without injury, ii. 341

Hemuse, name hunters give the roebuck the third year, iii. 136

Hen, in the Museum at Brussels, a creature covered with feathers and hair, said to be bred between a rabbit and a hen, iv. 15.

Hen of the common sort, moderately fed, lays above a hundred eggs from spring to autumn, v. 30---after three years become effete and barren---clutches one brood of chickens in a season---instances of two, very rare---number of eggs of a domestic hen in the year above two hundred, being well fed, supplied with water, and at liberty---trodden by the cock or not, she continues to lay---eggs of this kind never by hatching produce living animals---her nest made without care, 165---clucking season artificially protracted, and entirely removed, in what manner---left to herself, would seldom lay above twenty eggs without attempting to hatch them---as she lays, her eggs being removed, she continues to increase the number---in the wild state, seldom lays above fifteen eggs---particularities of incubation, 166---affection and pride after producing chickens---every invading animal she boldly attacks, the horse, the hog, or the mastiff---marching before her little troop, by a variety of notes calls her train to their food, or warns them of danger, 167---instance of the brood running for security into a hedge, while the hen stood boldly forth, and faced a fox that came for plunder, 168---artificial method of hatching chicken in stoves, practised at Grand Cairo, or in a laboratory with graduated heat, effected with woollen hens, by Mr. Reaumur---by these contrivances, from a hen naturally producing twelve chickens in the year, are obtained artificially above two hundred, 168---common hen supplies the place of the hen-pheasant, when refusing to hatch her eggs, and performs the task with perseverance and success, 188

Guinea hen, or *Barbary hen*, described, v. 191

Water-hen described, vi. 36---residence and food, 37---nest and habits, 38

Henry IV. king of Denmark, desirous of trying the skill of a musician, who boasted he could excite men to madness, submitted to the operation, became mad, and killed four of his attendants, ii. 170

Herculaneum overwhelmed in that eruption of Vesuvius in which Pliny the naturalist was suffocated—its ruins lately discovered at sixty feet below the surface, and forty below the bottom of the sea, i. 91

Hermaphrodites, such are all animals of the snail kind, vii. 30—the bivalve tribe are so too—they require no assistance from each other towards impregnation, 41

Hermetical sealing a glass vessel, the meaning of it, i. 168.

Heron, a ruminating bird, iii. 5—the great heron, in former times, bred familiarly in our marshes—not now, and why, v. 33—anatomical distinction in which herons differ from other birds—of this tribe Brisson has enumerated forty-seven sorts, 392—excessively destructive and voracious—ever have lean and carrion bodies—description of the common heron—flies at the approach of the sparrow-hawk, 393—commits the greatest devastations in fresh waters—a fish ever so large he will strike at, though unable to carry it away, 394—one heron, says Willoughby, will destroy fifteen thousand carp in half a year—usual attitude, waiting for prey—food in cold and stormy seasons, 395—manner of fishing, 396—Willoughby's receipt for taking him, 397—their nests, 398—never in flocks when they fish, but making nests, they love each other's society, 397, 398—flesh of the young esteemed in France—method used to obtain them, 398—the young once excluded, the old incessantly provide them with an amazing quantity of fish, 398—instance of it—by Mr. Keyser's account, this bird may exceed sixty years—recent instance of one taken in Holland, with a silver plate to one leg, and an inscription, that it had been struck by the Elector of Cologne's hawks thirty-five years before, 400—they contract a consumptive disposition, 396

Heron-bawling, a favourite diversion among our ancestors, had laws enacted for the preservation of the species—he who destroyed their eggs was liable to a penalty of twenty shillings for each offence, v. 393

Herrera confirms the existence of giants, ii. 261

Herring, its description, vi. 308---of migrating fish, this and the pilchard take the most adventurous voyages, 320---places where the herrings are in the greatest abundance---numerous enemies met in their migrations, 321---in Chesapeake bay, the shoals so great as to cover the shores, and become a nuisance, 322---that body upon our coasts, begins to appear off the Shetland isles in April; fore-runners of the grand shoal descending in June, and announced by the gannet, gull, &c. 323---fishermen take two thousand barrels at a single draught---places of Europe where herrings are punctual in their visitations, 324---doubts in every part of their migration---first great bank for herrings was along the Norway shore; before 1584, the number of ships from various parts of Europe resorting thither, exceeded some thousands---quantity of herrings then assembled there, was such that a spear stuck in the water, as Olaus Magnus asserts, would stand on end; soon after that period, they deserted the Norway shores, and took up along the German coasts, 325---no cause assigned for this seemingly capricious desertion---their greatest colonies now in the British channel, and upon the Irish shores, 326---a herring suffered to multiply unmolested, and undiminished for twenty years, would shew a progeny greater in bulk than ten such globes as that we live upon, 329

Hertfordshire, a dreadful storm which happened in it, in 1697, described, i. 375

Hexagons, with Pappus, the most convenient figures in building---cells of bees are perfect hexagons, viii. 70.

Hide of the elk, often known to turn a musquet ball, iii. 147

Hirra, island in the Mediterranean, risen and formed by subterraneous explosions, i. 126

Hiero, king of Sicily, had a crown of gold weighed hydrostatically by Archimedes, i. 190

Hind, or female of the stag, has no horns---time of gestation, and usual season of bringing forth---hides her young in obscure thickets, iii. 107---obliged to use all arts to conceal them from the stag, the most dangerous of her pursuers---how she defends her young, 108---the female stag still so called, the third year, 113---manner of knowing the track of a hind, 115---inhabitants of Canada have no other milk but that of the hind; and no other cheese but that

made of it, 124—the hunters name for the roe-buck, the first year, 136

Hippocampus, the *sea horse*, its description, vi. 285

Hippocrates, his opinion about the formation of the incipient animal, ii. 16

Hippopotamus, its dimensions, iv. 292—places where it resides—its food—swims with much force, and remains at the bottom for thirty or forty minutes, 393—it commits dreadful havoc among the plantations, 294—not afraid singly to oppose the lion, iii. 225—method the Africans use to frighten it back to its element—inoffensive in arts and disposition, iv. 294—never attacks mariners in their boats, unless inadvertently struck against, or otherwise disturbed, then it would send them at once to the bottom—instances of its great strength, 295—never goes beyond the mouth of fresh water rivers—attacked on shore, and incapable of vengeance upon a flying enemy, returns to the river, and plunges in head foremost—the negroes, apprised of its force, do not engage it—continues uncontrouled master of the river, all others fly its approach, or become an easy prey—moves slowly upon land—seldom goes from the river side, unless pressed by necessities of hunger, or of bringing forth its young—lives upon fish and vegetables; natives of Africa say it often devours children, and other creatures surprised upon land, 296—the young are excellent eating, 297—the female seldom produces above one at a time; hearing the slightest noise, she dashes into the stream, and the young one follows her with equal alacrity, 296—Dr. Pocock has seen their flesh sold in shambles like beef; their breast thought as delicate eating as veal—this creature, once plenty at the mouth of the Nile, now wholly unknown in Lower Egypt, and no where found but above the cataracts, 297

Historian, (natural) what his proper business, i. 7—going too much into speculation certainly wrong, and why, 19—method his principal help, ii. 289—faults of systematic writers, 291

History, (natural) of all other sciences has the least danger of obscurity, and why, ii. 300—best set forth, as Mr. Locke has observed, by drawings of animals, taken from life, 307—rule in natural history, that neither horns, colour,

fineness, or length of hair, or position of ears make actual distinctions in the kinds, iii. 60—accounts of fishes little entertaining; philosophers not studying their nature, but employed in increasing their catalogues, vi. 152—Dampier has added more to it than half the philosophers before him, 391—one of the strangest discoveries in all natural history, viii. 156

Hobby, bird of the generous breed of hawks, for smaller game, daring larks, and stooping at quails, v. 122.

Hogs, animals of this kind resemble those of the horse as well as the cow kind, and in what—this kind partakes of the rapacious and the peaceful kinds, iii. 171—offend no animal of the forest, 172—remarkable that none of this kind ever shed their teeth, 173—any animal dying in the forest, or so wounded as to make no resistance, is the prey of the hog, who refuses no animal food, however putrid, 175—in a state of wildness, most delicate in the choice of its vegetables, rejects a greater number than any other, 176—they eat but seventy-two plants, and reject an hundred and seventy—indelicacy of this animal more in our apprehensions than in its nature, and why—in orchards of peach-trees in North America, reject the fruit that has lain a few hours on the ground, and watch hours for a fresh wind-fall, 177—have had mice burrowing in their backs while fattening in the sty, without seeming to perceive it—scent the hounds at a distance—by nature stupid, inactive, and drowsy, has passions more active only when incited by venery, or when the wind blows with vehemence, 178—foresees the approach of bad weather—much agitated on hearing any of its kind in distress—have often gathered round a dog that teased them, and killed him upon the spot—their various diseases—generally live, when permitted, to eighteen or twenty years; the females produce to the age of fifteen—in the wild state less prolific, 179

Guinea hog, and that about Upsal described, iii. 181

Water hog. See *Capibara*.

Hog of Bourro. See *Babyroussa*.

Hog of the isthmus of Darien, described by Wafer, iii. 196

Hobanno, a river in Asia—its course 210—receives thirty-five lesser rivers, i. 217.

Holland, a conquest from the sea, and rescued from its bottom—the surface of its earth below the level of the bottom of the sea; upon approaching the coast, it is looked down upon from the sea, as into a valley, every day rising higher, and by what means—those parts which formerly admitted large men of war, are now too shallow to receive ships of moderate burthen, i. 276

Honey, from what part of the flower it is extracted, viii. 75—two kinds of it—which to be preferred, 89—that gathered by the humble bees not so fine, nor so good as that of the common bees, 92—gathered by the black bees in the tropical climates, neither so unpalatable, nor so surfeiting as ours—produced by the bees at Guadeloupe, never congeals, remains fluid, of the consistence of oil, with the colour of amber, 90—the polecat and the martin feed upon honey, iii. 358

Honeycomb, name of the second stomach of ruminating animals, iii. 3

Hoof of the Persian mares, so hard, that shoeing is unnecessary, ii. 355

Hooper, name of the wild swan, on account of the harshness of its voice, vi. 113

Horizon, seems wrapt in a muddy cloud, upon the approach of winter, under the line, i. 378

Horn, to wind it, and to carry the hawk fair, formerly sufficient accomplishments for noblemen's sons, v. 118

Horns, in what manner those of animals are produced, ii. 101—grow differently in deer from those of sheep or cows—deer's horns furrowed along the sides, and why, iii. 97—in every respect resembling a vegetable substance, grafted upon the head of the stag, 99—beauty and size of those of a stag, mark their strength and their vigour, 98—the time of shedding them—severe winters retard the shedding the horns in stags, 99—generally increase in thickness and height from the second year to the eighth—partake of the nature of the soil, 100—their horns shed, they seek the plainer part of the country, remote from those animals they are then unable to oppose; and walk with their heads stooping down, as to prevent striking against branches of trees, 101—of a stag, called his head—their names according to different ages of the stag, 113—of the elk applied to the same purposes as hartshorn, 148—the author saw one, of ten feet

nine inches from one tip to the other, 141—of the reindeer converted into glue, 167—of the rhinoceros, sometimes from three to three feet and an half long, composed of the most solid substance, and pointed to inflict most fatal wounds, iv. 286—of owls nothing more than two or three feathers that stand up on each side of the head, over the ear, v. 140

Horses, characteristic marks given by Linnæus—eats hemlock without injury, ii. 341—near as the ape approaches man in internal conformation, so the horse is the most remote. 342—wild horses herd together, and feed in droves of five or six hundred—one among their number always stands a centinel, 343—there are but three animals of the horse kind, 390—a ruminating animal, iii. 5—in a course of years impoverish the ground, 10—eats two hundred and sixty-two plants, and rejects two hundred and twelve, 176—famished horses more hairy than those fed plentifully, 355—a horse will not carry upon its back, a weight of more than two or three hundred pounds, ii. 112—to estimate the strength of a horse, is not to try what he can carry, but what he can draw—he draws a load ten men cannot move; and in some cases a draft-horse draws better being somewhat loaded, 114—allured by music, 169—not readily attacked by the lion—the combats between them in Italy, 319—for hunting lions, must be of that sort called charossi; all others fly at the sight of the lion, iii. 226—are killed by wild asses, 380—destroyed by the American bat, called vampire, in South America, iv. 145—one fond of oysters, ii. 327—from what country the horse came originally uncertain—according to the ancients, wild horses once in Europe—the colder climates do not agree with them, 344—how wild horses are caught—set at liberty they never become wild again—the Buccaneers agreeably surprised to see their faithful horses present themselves again with their usual assiduity, and receive the rein, 345—wild horses finding a tame horse to associate with them, gather round him, and oblige him to seek safety by flight, 346—this animal in the state of nature in the old, not the new world, 345—countries where wild horses are found, 346—the natives of Angola, or Cafraria, catch a horse only to eat him—*Arabian wild horses*, the most beautiful breed, the most generous, swift and persevering, 347—the negroes shew terror and

surprise, when first they see a horse, 346—no Arabian, however poor, but has his horse—tame Arabian horses, some valued at a thousand ducats; 349—different classes among the Arabians—they know the race of a horse by his appearance—Arabians preserve the pedigree of their horses with care, for several ages, 350—countries into which the race of their horses has spread itself, 354—they take the wild horses with traps—the young horse considered by them as a great delicacy; they feast upon him while any part is remaining—the usual manner of trying the swiftness of Arabian horses, by hunting the ostrich; and an horse of the first speed is able to out-run it, 348—treat their horses gently—hold a discourse with them—written attestations given to persons who buy Arabian horses, 351—they stand stock still in the midst of their career, the rider happening to fall; 352—keep them saddled at their tents from morning to night, to prevent surprise—when the Arabians begin to break their horses, 353—how the Arabians dress and feed their horses; 352—first began the management of horses in the time of sheque Ismael, 349—the rapidity of the flight of Arabian horses is such that the dogs give up the pursuit, 347—upon computation, the speed of the English horses is one fourth greater, carrying a rider, than that of the swiftest barb without one, 355—Numidian race much degenerated—the Tingitani and Egyptians have the fame of rearing the finest horses, for size and beauty, 356—horses of Barbary—an Italian peculiar sport, in which horses of this breed run against each other, 354—Spanish genetie described, 356—those of Andalusia pass for the best, and preferred as war horses to those of every other country—Italian horses have a particular aptitude to prance; 357—the horses of India, weak and washy; 362—fed with peas, sugar, and butter—one brought to England not much larger than a common mastiff—climates excessively hot seem unfavourable to horses—remarkable sports on horseback—the horses of the Gold Coast and Guinea extremely little, but very manageable, 363—of China, weak, little, ill-shaped, and cowardly—those of Corea so timorous, as not to be serviceable in war—Tartar horses very serviceable in war; they were properly the conquerors of China, 364—march two or three days without stopping—continue five or six, without eating more than a handful of grass at every eight hours;

and remain without drinking four and twenty hours—lose all their strength when brought into China or the Indies; thrive pretty well in Persia and Turkey, 365—ancient opinions on the nature and qualities of the horses of Thessaly, Achaia, Ethiopia, Arabia, Afric, Italy, and particularly of Apulia, of Sicily, Capadocia, Syria, Arminia, Media, Persia, of Sardinia and Corsica; of Spain, Walachia, Transylvania, of Denmark, Scandavinia, Flanders, of the Gaulish horses, of the German, Swiss, Hungarian, and lastly of the English horses, 365—*Danish* horses of such excellent size and strong make; that they are preferred to all others for draught, 357—some streaked like the tyger, or mottled like the leopard—*German* and *Hungarian* horses—*Dutch* horses are good for draught; the best come from the province of Friezeland—the *Flanders* horses—few *French* horses good, 358—in general are heavy shouldered—the best of that country come from Limosin, and Normandy furnishes the next—*American* tame horses admirable, 359—method of hunting with them, 360—--islands of the Archipelago have very good horses—those of Crete were in great reputation among the ancients, at present little used in the country itself, because of the unevenness of the ground—the original horses of *Morocco*, smaller than the Arabian breed—in Turkey there are horses of all races—*Persian* horses, in general, the most beautiful and most valuable of all the east, 361—some greatly esteemed in the Ukraine, in Walachia, Poland, and Sweden, 365—with bushy tails, and manes down to the ground, 366—*English* horses excel the Arabian in size and swiftness; are more durable than the barb, and more hardy than the Persian—one instance of their great rapidity, in the admirable Childers, frequently known to move eighty-two feet and a half in a second, 367—--fault of our manner of breaking horses—the French managed horse never falls before, but more usually on one side—the English are for speed and despatch, the French, and other nations, are more for parade and spirit, 368—English hunters considered the noblest and the most useful horses in the world—Roger de Belegme, the first recorded to have attempted mending our native breed, 369—number of horses in London in the reign of king Stephen, said to have amounted to twenty thousand—in the times of Queen Elizabeth, the kingdom could not supply two thousand horses to

form the cavalry—Powisland, in Wales, for many ages famous for a swift and a generous race of horses, and why; 370—perfections which a horse ought to have, according to the Camerarius, 372—the horse and the ass differ not so much in form as the cow and the bison, yet the former are distinct animals, and the latter animals of the same kind, iii. 15

Sea-Horse described, vi. 285

Horatius, the orator, the first who had peacocks served up at an entertainment in Rome, v. 173

Hospitals erected in India; for the maintenance of all kinds of vermin, ii. 225—for monkeys, erected by the Bramins, iv. 234—Aldrovandus; having spent a fortune for the purposes of enlightening mankind, was at last so greatly reduced as to want bread; to feel the ingratitude of his country, and to die a beggar in a public hospital, vi. 115

Hottentots, outstrip lions in the chace, as travellers report, ii. 114—make much and very extraordinary use of the bison, iii. 21

Hound, harrier, and beagle, all of the same kind, iii. 283—*grey-matin* hound, transported to the North, becomes a great Danish dog; and this, sent into the South becomes a grey-hound of different sizes; the same transported into Ireland, the Ukraine, Tartary, Epirus, and Albania, becomes the great wolf dog; known by the name of the *Irish wolf-dog*; 284—the *blood-hound*, a dog of the generous kind—and likewise the *gaze-hound*, and the *grey-hound*, 286—the blood hound a dog of great use, and in high esteem among our ancestors—its employ—the gaze-hound, hunted, like our grey-hound, by the eye, not by the scent, 287

Grey-bound-fox, the largest, tallest, and boldest of the kind, iii. 332

Howlet, a kind of owl without horns, v. 141

Hudson's-Bay, above twelve thousand martins skins annually imported from thence into England, iii. 272

Huers, name given to the men employed to give signals where to extend the nets in the pilchard-fishery, vi. 327

Hughes, has described a species of polypus, but mistaken its nature, and called it a sensitive flowering plant, viii. 191

Hull, had the honour of first attempting that profitable branch of trade, the whale fishery, vi. 200

Humber, a new island formed at the mouth of this river—it is about nine miles in circumference, and worth to the proprietor about eight hundred pounds a year, i. 132

Humming-bird, is the smallest of birds, and seems nearly allied to the insect, v. 40—belongs to the sparrow kind, 314—the smallest of them about the size of a hazel-nut—its description—the larger humming-bird is near half as big as the common wren—its description—are seen fluttering about the flowers, without ever lighting upon them—their wings in such rapid motion, it is impossible to discern their colours, except by their glittering, 356—but only extracting the honey as with a kiss—their nests and the number of eggs, 357—their time of incubation, 358—instance of their docility—countries where found—in the Leeward islands, they continue in a torpid state during the severity of winter, 359—Labat asserts, that besides the humming noise produced by their wings, they have a pleasing melancholy melody in their voices, small and proportioned to their organs—the Indians made use of this pretty bird's plumage—in what manner the children take them—when taken, they are instantly killed, and hung up in the chimney to dry; some dry them in stoves, 360—at present the bird is taken rather for selling as a curiosity to Europeans, than an ornament for themselves, 361

Hump of the bison of different sizes, weighing from forty to fifty pounds, sometimes less—cuts and tastes like a dressed udder, iii. 23—in a few generations it wears away, 24

Hunger, every animal endures the wants of sleep and hunger with less injury to health than man, ii. 124—hunger kills man sooner than watchfulness—more dreadful in its approaches than continuance, 125—dreadful effects of hunger, related to the author by the captain of a ship, who was one of six that endured it in its extremities, 126—different opinions concerning the cause of hunger, 128—few instances of men dying, except at sea, of absolute hunger—those men whose every day may be considered as an happy escape from famine, at last die of a disorder caused by hunger, 129—the number of such as die in London of hunger supposed not less than two thousand in a year, 130—method of palliating hunger among the American Indians, 133—instances of amazing patience in hunger, 217

Hunters, the English considered as the noblest and most useful horses in the world, ii. 369—terms used by hunters in pursuing the stag, iii. 114—names invented by them for the stag, 113—for the fallow-deer, 128

Hunting, the natural right of hunting made royal, and when, iii. 109—the stag and the buck performed in the same manner in England, and how, 112—the wolf, 318—wolves used in hunting, 321—hunting of the fox, 328—ancient manner of hunting the stag, 119—the manner in Sicily, 120—and in China, iii. 122—hunting the sable chiefly the lot of the exiles in Siberia, 375—the ouran-outang, or wild man, in Borneo, iv. 200—a favorite amusement of the king, 200—of the elephant at the Cape of Good Hope, 280—the method used to take it alive, 271, 272—manner of hunting the ostrich by the Arabians, v. 59, 60—and by the Struthophagi, 61—manner of hunting the turkey, 179

Hurco, (Aufidius) charged by Pliny with being the first who fattened peacocks for the feasts of the luxurious, v. 172

Hurricane, the cloud preceding a hurricane, called by sailors, bull's eye, described, i. 359—houses, made of timber, bend to the blast of the hurricane like osiers, and recover their rectitude—hurricanes offensive to the sense of smelling—maggots brought with them—common in all tropical climates; on the coasts of Guinea, frequently three or four in a day, 360—their seasons upon those coasts, at Loango and the opposite coast of Africa, 361—the hurricane called tornado, its dreadful effects, i. 361

Hus, in Greek signifies a sow, and *buina* derives from it, iii. 342

Huse, the isinglass fish, caught in great quantities in the Danube, from October to January—furnishes the commodity called isinglass—often above four hundred pounds weight—its flesh salted is better tasted, and turned red like salmon, vi. 278

Hyena, no words give an idea adequate to this animal's figure, deformity, and fierceness, iii. 343—more savage and untameable than any quadrupede—its description, 341—defends itself against the lion, is a match for the panther, and attacks the ounce, which it seldom fails to conquer—an obscene and solitary animal—its first howl sometimes mista-

ken for the voice of a man moaning—its latter like the violent efforts of reaching, 343—whence it first took its name, 342—native of the torrid zone; resides in the caverns of mountains, the clefts of rocks, or dens it has formed under earth, 344—taken ever so young, it never can be tamed—sometimes attacks man; and carries off cattle—its eyes shine by night; and it is asserted that it sees better by night than by day—scrapes up graves, and devours dead bodies, how putrid soever—absurdities of the ancients about this animal, 344

I.

Jabiru, and *jabiru-guacu*, birds of the crane kind; natives of Brasil, v. 388—their descriptions, 389

Jackals, hunt in a pack, and encourage each other by mutual cries—what has given rise to the report of its being the lion's provider, ii. 322—travellers have mistaken the jackall for the fox, iii. 333—one of the commonest wild animal's in the East; yet scarce any less known in Europe; or less distinctly described by natural historians—its description—it's cry a lamentation resembling that of human distress—is more noisy in its pursuits than a dog, more voracious than the wolf—never goes alone, but always in a pack of forty or fifty together—seems little afraid of man; pursues its game to the doors, without apprehension—enters insolently into sheep-folds, yards, and stables, and finding nothing else, devours leather harnesses, boots, and shoes—scratches up new made graves, and devours the corpse how putrid soever, 335—the corpse how dug up—follows armies, and keeps in the rear of caravans—the most putrid substances it greedily devours—hides in holes by day, and appears abroad at night-fall, 336—hunts by the scent, 337—irreconcilable antipathy between it and the dog, 338—no wonder it be voracious, and why—is as stupid as impudent—instances of it—Indian peasants often chase it as we do foxes, 338

Jack-daw, its description, v. 230—rings found in the nest of a tame jack-daw, 222

Jacobines, a kind of pigeons, v. 293

Jaculus, the swiftest serpent, its manner of progression by coiling, vii. 182

Jaguar, or the panther of America, iii. 252, 253

James, the hermit, said to have lived an hundred and four years, ii. 132

Japan, the emperor made a présent, to the value of sixty thousand crowns, for a zebra, which a governor of Batavia had given to him, ii. 398

Japanese, description of that people, ii. 222

Jaw, the upper, thought by many quite immoveable; that it moves in man, an easy experiment will evince—has its proper muscles behind the head for thus raising and depressing it, ii. 90—the under jaw in the embryo much advanced before the upper; and in the adult, it hangs more backward, 91—and in a Chinese face it falls still more backward than with us; the difference is thought half an inch, the mouth being shut naturally—M'Laurin, a professor at Edinburgh, was subject to have his jaw dislocated—the under jaw has often an involuntary quivering motion; and often a state of langour produces another, that of yawning, a very sympathetic kind of languid motion, 92—ridiculous instance of this sympathetic affection commonly practised upon the same famous M'Laurin, 92

Jay, one of the most beautiful of the British birds—its description—feeds upon fruits, kills small birds, and is extremely docile, v. 241—lays its eggs in the holes deserted by the wood-pecker, 253

Ibex, a native of the Alps, the Pyrenees, and the mountains of Greece—its description, iii. 62

Ibis, the Egyptians paid divine honours to this bird, 384—different opinions concerning the ancient and modern ibis—Maillet's observations to this purpose—the true ibis thought a bird of the vulture kind, called by some the capon of Pharoah, 385

Ice, very elastic, i. 180—floats of it diffused into plains of above two hundred leagues in length—and mountains of it rising amidst them—flat ice, and mountain ice, 243—their formation, 244—mountains of it presenting the resemblance of a glory, i. 245

Ichneumon, by some injudiciously denominated the cat of Pharoah, one of the boldest and most useful animals of the weasel-kind—used in Egypt for the same purposes as cats in Europe—description, iii. 376—discovers and destroys the eggs of the crocodile, 377—serpents its most natural food—grows fast and dies soon, 379—easily strangles a cat stronger and larger than itself, 378—countries where found, 379—attacks every living thing it is able to overcome, and

fears not the force of the dog, nor the claws of the vulture; 377—takes the water like an otter, and will continue under much longer, 378—not able to support the rigour of our winters—one come from the island of Ceylon climbed up the walls and the trees with very great ease, 379—this animal one of those formerly worshipped by the Egyptians; 380

Ichneumon fly, of all others the most formidable to insects of various kinds, viii. 46—it makes the body of the caterpillar the place for depositing its eggs, 47—the tribe is not the caterpillar's offspring, as was supposed, but its murderers, 48—description—whence its name—fears not the wasp, and plunders its habitations, 111—its weapon of defence—flies of this tribe owe their birth to the destruction of some other insect, within whose body they have been deposited, and upon whose vitals they have preyed, till they came to maturity, 12—various appetites of the various kinds of this fly, 113—the millions of insects this fly kills in a summer inconceivable, 114

Ichneumon; a root the Indians believe an antidote for the bite of the asp or the viper, iii. 377

Idra; the deplorable infirmities of the workmen in the quicksilver mines near it; i. 79

Jean-le-Blanc, a kind of eagle—its distinctive marks; v. 98

Jenisca, in Tartary, a river; i. 216—receives above sixty lesser rivers, i. 217

Jenkins, a peasant, lived to an hundred and sixty-five years, without much regularity, ii. 201

Jesser, in England, as late as the times of king James I. the court was furnished with a jesser, ii. 251

Jevraska, name given to the marmout in Siberia, iv. 48

Jewels, the richest Jewels found in an Ethiop's ear, a proverb, ii. 98

Ignis fatuus, or wandering fire, i. 380

Iguana, description of this animal, vii. 149—its flesh the greatest delicacy of Africa and America—its food, vii. 150 in what manner it is taken, 151

Jiboya, the Great, of Java and Brasil; the dimensions of this serpent, vii. 225

Ilex, the berry bearing ilex, viii. 143

Imagination by day as well as by night, always employed, ii. 143—very remarkable instances of its power in women, 245

Impaling, in some courts of the more barbarous princes of India, they employ the elephant to impale the criminals on its enormous tusks, iv. 279

Impregnation, the hare, though already impregnated, admits the male, and receives a second impregnation, iv. 6—in what manner the sea and garden snails impregnate each other respectively, vii. 22—the bivalve shell-fish require no assistance from each other towards impregnation, 41—frogs impregnated without any apparent instruments of generation, an object of inquiry; continues in great obscurity—experiments made to this purpose, 78

Impulsion, manner of acting upon the heavenly bodies, i. 4

Incar, father Acosta, and Garcilasso de la Vega have seen the bodies of several Incas perfectly preserved from corruption, ii. 273

India (East) in the warm countries of India, the women are marriageable at nine or ten, and the men at twelve or thirteen, ii. 71—description of the inhabitants of the islands that lie scattered in the Indian ocean, 223—over all India, children arrive sooner at maturity, than in Europe—they often marry and consummate, the husband at ten years old, and the wife at eight, and frequently have children at that age, vi. 320—Indians have long been remarkable for cowardice and effeminacy—they may be considered as a feeble race of sensualists—their dress, ii. 225—the horses of India are weak and washy, 362—lions are found to diminish in their numbers in this country, iii. 215—the Indians eagerly pursue the porcupine, in order to make embroidery of its quills, and to eat its flesh, iv. 112—they eat bats in the East Indies, 141—in some courts of the more barbarous princes, the elephants are used as executioners—in what manner that animal performs this horrid task—and impales criminals on its enormous tusks, 279—in the whole peninsula of India, they employ the elephant in carrying or drawing burthens, 278—and also in launching ships, 279

India (West) whence originally comes the flat heads of the American Indians, ii. 239

Indus, river, its course, i. 212—its water, and that of the Thames, the most light and wholesome in the world, i. 170—the tide at the mouth of this river the greatest known, i. 257

Infants just born, may be said to come from one element into another, and why, ii. 53—open their eyes the instant of their birth, 54—more capable of sustaining hunger, and more patient of cold than grown persons, and why, 58—infants have milk in their own breasts—their life very precarious, till the age of three or four, 59—instances of it, 60—the comparative progress of the understanding greater in infants, than in children of three or four years old, 61

Inundations generally greater towards the source of rivers, than farther down, and why, i. 207—some distribute health and plenty—others cause diseases, famine, and death, 218—every inundation of the sea attended with some correspondent dereliction of another shore—one of the most considerable inundations in history, is that which happened in the reign of Henry I. an inundation in the territory of Dort, destroyed an hundred thousand persons—and yet a greater number round the Dullart—remarkable inundations in Friesland and Zealand, in which more than three hundred villages were overwhelmed—their remains continue visible at the bottom of the water in a clear day, 278—some in which the sea has overflowed the country, and afterwards retired, 279—inundation of the Thames at Dagenham, in Essex, 283—instantly produced by land spouts, 396

Insects, many of the tribes brought forth from the egg, ii. 27—in the internal parts of South America, and Africa, they grow to a prodigious size, and why—those of the minute kind in the northern climates not half so large as in the temperate zone, 6—the ocean has its insects—their feet are placed upon their backs, and almost all without eyes, 7—in some countries almost darken the air, and a candle cannot be lighted, without their instantly flying upon it, and putting out the flame, 12, and viii. 158—many may be multiplied by being cut in pieces, ii. 23—have no eye-lids whatsoever, ii. 85—the Indians are fearful of killing the meanest, 225—quickly brought to change, and adapt themselves to the climate, ii. 312—have their stomachs composed of muscular fibres—of a ruminating kind, iii. 6.—afford so great a variety as to elude the search of the most inquisitive pursuer,

v. iii.—those with the greatest number of legs move the slowest, vii. 63—the general definition of insects, 239—the different classes, 241—general characteristics of insects without wings, 246—of those that have wings, 315—Swammerdam has excelled the insects he dissected, in patience, industry, and perseverance, 17—some continue under the form of an aurelia not ten days; some twenty; some several months, and even for a year, viii. 26—general rule, that the female is larger the male, 39—every insect that lives a year after its full growth, is obliged to pass four or five months without nourishment, and will seem to be dead all that time, 125—description of that which forms and resides in the gall-nut, 148

Instinct of animals in chusing the proper times of copulation, ii. 337—the Guinea pig has not that natural instinct so common to almost every other creature, iv. 57

Intestines of sheep found to be above thirty times the length of the body, iii. 209—those of the wild cat not above three times the length of its body, 210—this shortness still unaccounted for, 211—intestines of ruminating animals enlarged by nature, to take in a greater supply—those of the carnivorous kind are short, 2—also thin and lean; but of the ruminating are strong, fleshy, and covered with fat, 4—in all animals the size of the intestines proportioned to the nature of the food, ii. 318—of the rein-deer washed like our tripe, in high esteem among the Laplanders, iii. 167—of the bat, in some measure resemble those of man, iv. 135—those of the manati longer, in proportion, than those of any other creature, the horse excepted, 185—the tribe of woodpeckers want that intestine, called the cæcum, v. 249—the lamprey seems to have but one, vi. 268—those of the crab have many convolutions, 364

Jobndory, Quin noted for a sauce for this fish, vi. 180

Joints, hair in its growth sends forth branches at the joints, ii. 87

Jonelin, has obliged the curious with the first accurate description of the form and nature of the sable, iii. 373

Ireland not infested with wolves, iii. 319—frogs designedly introduced into that kingdom some years before the Norway rat, iv. 66—that rat put a stop to their increase, and the frog is once more almost extinct in that kingdom, 67—the more utterly a stranger there, 91

Iron extracted from all the substances upon earth, i. 74

Isatis, an animal very common in all northern countries bordering upon icy sea, and seldom found in warm climates—description, iii. 339—burrows like the fox, and when with young, the female retires to her kennel, in the same manner as the fox—its kennel very narrow, and extremely deep, has many out-lets—manner of coupling, time of gestation, and number of young, all similar to what is found in the fox—brings forth at the end of May, or the beginning of June, 340—considered as between the dog and the fox, 339—changes its colour, and is at one time brown, at another white, 340—time in which it is called the *cross-fox*, 341

Isinglass serviceable in medicine, and many arts, vi. 278 manner of making it—principally furnished from Russia, where great quantities are prepared surprisingly cheap—Mr. Jackson found out a method of making a glue that answered the purposes of isinglass, 278

Islands, new formed, in two ways, i. 225—thirteen islands in the Mediterranean appearing at once emerging from the water, 126—one new formed in the year 1720, near that of Tercera, 128—formed at the mouths of many rivers, and how, 130—a beautiful and large one formed at the mouth of the river Nanquin, in China, not less than sixty miles long, and about twenty broad, 131—appear, at first, infinitely greater than they naturally are, 388—seem to travel to the shore, and represent a wood—the scene then shifted, represents curious figures, ships with sails, streamers, and flags; antique elevated castles, and at length vanish into nothing, 389

Ismael, sheque, in his time the Arabians first began the management of horses, ii. 349

Ispahan, the prince's messengers go on foot thirty-six leagues in fourteen hours, ii. 114

Italy, the horses there have a particular aptitude to prance, ii. 357

Jucatan, a peninsula in the gulph of Mexico, formerly a part of the sea, i. 276

Juda-goat common in Guinea, Angola, and all along the coasts of Africa, not much larger than a hare, iii. 59

Jugular fish, name given to that fish which has the ventral fins placed more forward than the pectoral, vi. 298

Julian's Bay (St.) an American harbour, forty-nine degrees south of the line—Ferdinand Magellan happened to winter in it, ii. 260

Juniper, the Laplanders drink water, in which these berries have been infused, ii. 216—its shade was fatal, if we credit the ancients, i. 326

Ivory, the tusks of the babyroussa are a very fine ivory, smoother and whiter than that of the elephant, but not so hard or serviceable, iii. 194—that of the morse more esteemed than that of the elephant, being whiter and harder, iv. 182—almost all our ivory comes from Africa, where the greatest part is found in the forests, 281—the tusks of the mammoth converted to the purposes of ivory, 282—teeth of the narwhale far surpass ivory in all its qualities, vi. 209

Justinian, the emperor, till his time the sea was open to all nations, i. 232

Ivy-berries, showers of them raised by tempests in one country, and falling in another, i. 390

K.

Kabassou, or cataphractus, one of the largest kinds of the armadilla, iv. 133

Kamskaska, description of its natives, ii. 213

Kangaroo, an animal first discovered and described by Mr. Banks, iv. 351, *et seq.*

Kempfer very well describes the effects of the shock of the torpedo, vi. 258

Keratophites, among the coroline fungi, viii. 197

Kermes, an insect of great use in medicine and dying—its description, viii. 143—the differences of the male from the female—the harvest of the kermes greater or less in proportion to the severity of the winter—women gather them before sun-rising, tearing them off with their nails, 144

Kestrel, a bird of the generous breed of hawks, v. 122

Kevel, name of a second variety of gazelles made by Mr. Buffon, iii. 73

Kilda (St.) a rocky island—its shores to the West six hundred fathom perpendicular above the surface of the sea, i. 272—its rocks more than three quarters of a mile high, vi. 76—the inhabitants consume annually near twenty-three thousand young gannets, and a great quantity of their eggs,

Killer, a cetaceous animal of surprising strength, which attacks the whale, vi. 200

Kinds of animals not actually distinguished by horns, colour, position of the ears, or fineness of hair, iii. 60—difficult to fix precise boundaries between the goat-kind and the deer, 70—the gazelles form a distinct kind, 71—all of the deer kind have no gall bladder, 94

Kine, in Iceland are without horns, iii. 19

King, a question in schools, which man most happy, the beggar by night, and king by day; or the beggar by day, and king by night, ii. 139

King-fisher, a remarkable bird---its description, vi. 140—places it frequents, and how it takes its prey—the plumage a beautiful variety of brilliant colours, vi. 140—instances of credulity with respect to this bird, 142—its nest, or rather hole, very different from that described by the ancients, vi. 143—feeds upon fish in that hole—satisfied from the remains of fish—the king-fisher is found with from five to nine eggs, which the female continues to hatch—though disturbed and robbed, she returns, and lays again—Reaumur's account of this—season for excluding the brood—the male, faithful beyond the turtle, brings the female large provisions of fish, and keeps her plump and fat—he used to twitter before, now enters the nest quietly and privately—the young hatched in twenty days—differ in their size and beauty, 144

King-fisher, the *Halcyon*—Cicero has written a long poem in praise of this bird, of which but two lines remain—the emperor Gordian has also written a poem on it, nothing of which is left—St. Ambrose's credulity concerning this bird, vi. 142—fables the modern vulgar have of it, 145—its flesh unfit to be eaten, and its beautiful plumage preserves its lustre longer than any other, 146

Kircher, his calculations of the heights of the mountains are incredible, and why, i. 154—has set the voices of birds to music, v. 143

Kite, one of the baser race of hawks, v. 119—distinguished by its forked tail, and slow floating motion, 129—from the greatest height darts down on its prey with unerring aim, 10—seems ever upon the wing, and to make no effort in flying—lives upon accidental carnage, every bird in the air being able to make its retreat from it—small birds wounded, or straying chickens it seizes with rapacity,

129—used for training falcons, and how lured with the great horned owl, when caught for that purpose, 144

Kitten, of all young animals none more prettily playful; iii. 202

Klein, his method of classing animals; ii. 296

Knobber, name of the stag the second year, iii. 113

Knot, small bird of the crane kind; vi. 23—a bird of passage, 28

Kob, the name of the sixth variety of gazelles by Mr. Buffon, iii. 74

Koba, name of the fifth variety of gazelles, by Mr. Buffon, iii. 74

Kraken, all that has been said of this great fish seems fictitious, yet there is a possibility of its existence, vi. 189

Kranke's account of the origin and formation of the ice-mountains in Greenland; i. 246

L.

Labrus, the wrasse, description of this fish; vi. 302

Labyrinth of Candia, a subterranean wonder, supposed the work of art, i. 63

Labyrinth, convolutions in the wind-pipe and lungs of some birds, v. 13

Lama, the camel of the new world, iv. 312—countries where found—their flesh an excellent food—their hair, or rather wool, spun into beautiful clothing—carry their burdens over precipices and craggy rocks, where men can scarce accompany them, 313—description and age—manner of coupling, 314—its food—exceeds the camel in temperance—requires little water, being supplied with quantities of saliva, the only offensive weapon it has to testify its resentment—the Indians say, where this saliva falls, it will from its acrimonious nature burn the skin, or cause dangerous eruptions, 315—colour and wool—habits and marks of agility in the state of nature—seems the largest of the camel kind in America—the natives hunt the wild lama for its fleece, 316—a smaller weaker sort of the camel kind, called also guanacoe and paco—the manufacture of stuffs, carpets, and quilts, made of the wool of the paco, form a considerable branch of commerce in South America, and might usefully be extended to Europe, 317

Lambs, how to be produced all the year round, ii. 338—the third an ewe brings forth supposed the best, iii. 45

Z 2

Lamprey, its food, vi. 268—a fish every way resembling the lamprey, was possessed of the numbing quality of the torpedo, 263—people will not venture to touch those of Ireland—a species very different from ours served up as a delicacy among the modern Romans—doubtful whether it be the murena of the ancients, which our lamprey is not—ours differently estimated, according to the season, 265—those of the river Severn the most delicate of all fish—description of the fish, extraordinary power of adhering to stones—instance of it. 266—Muralto, giving the anatomy of this fish, makes no mention of the lungs, for which it has absolute necessity to breathe in the air, 267—its time of leaving the sea annually, in order to spawn, is the beginning of spring—after a few months, it returns to the sea—peculiar preparation for spawning—the young from eggs—the female remains at the place where produced—they are excluded till they come forth, has her family playing about her, and conducts them in triumph to the ocean, 268—some continue in fresh water till they die—a single brood the extent of the female's fertility, two years being the limit of her existence—best season for them the months of March, April, and May—are usually taken in nets with salmon; sometimes in baskets at the bottom of the river—old custom for the city of Gloucester annually to present the king with a lamprey-pye, 269—a senator of Rome used to throw into his ponds such of his slaves as displeased him, to feed the lampreys, 270

Lands, new, produced from the sea, and in what manner, i. 277

Lanner, bird of the generous breed of hawks, now little known in Europe, v. 121

Lapland, its division, iii. 153—mountains there preferred to the woods—the country abounds more than others with marshy bottoms and weedy lakes—gnats and gad-flies formidable there, 155—the manner of travelling in it, 162—Laplanders castrate the rein-deer with their teeth, 365—the wolf never attacks a rein-deer that is haltered, and why, 321—the isatis found in this country, 340—in the forests, squirrels observed to change their habitation; they remove in numbers from one country to another, iv. 32

Laplanders, one of the first distinct race of men round the polar regions—description of their persons and manners, ii. 213—have in every family a drum for consulting the devil,

214—Gustavus Adolphus attempted in vain to form a regiment of Laplanders—use skates to run and slide, and how, 215—are all hunters—offer their wives and daughters to strangers, 216—wants supplied, and riches derived from the rein-deer, iii. 149—manner of life, 154—boil milk with wood-sorrel, and keep it in casks under ground to be eaten in winter, 166—when the lemins draw up to fight, they form ominous prognostics from their arrangement, iv. 88—happy when an army of lemins comes down among them; they then feast upon their flesh, which dogs and cats detest, 90

Lapwing, a small bird of the crane kind, vi. 23—its arts to lead off men and dogs from their nests, 32—their seasons of courtship, 31

Lark, bird of the sparrow kind, v. 314—the sky, the wood, or the tit lark distinguishable from other little birds by length of heel and loud song, 333—nest, number of eggs and habits, 334—those that remain with us the year throughout are birds of passage in Sweden, 318

Sea-Lark, a small bird of the crane kind, vi. 23—breeds in this country, 29

Lava, matter, discharged by the eruptions of volcanos, i. 103

Laughter, in what manner produced, ii. 92

Launce, description of this fish, vi. 305

Lauricocha, a lake wherein the river Amazon has its source, i. 215

St. Lawrence, a river—its rise and course, i. 216—receives about forty rivers, 218—its cataract, 223

Laws, one in the Orkney islands, entitling any person that kills an eagle to a hen from every house in the parish where killed, v. 92

Layer, the impression on the place where the stag has lain, iii. 114

Layers of the earth regularly disposed, but not of the same kind in every place, i. 56—enumeration of layers of earth in a well dug at Amsterdam, and of another dug at Marly, 57—a layer, as far as it extends, always maintains the same thickness—proceeding to considerable depths, every layer is thicker—are sometimes very extensive, and often found to spread over a space of some leagues in circumference, 58

—remarkable layers of earth round the city of Modena, 282

Lead-Mine, one in Flintshire, iv. 282

Leather called chamois, made of the skin of that animal, and also from those of the tame goat, the sheep, and the deer, iii. 69

Leather-barnes devoured by the jackall, iii. 335

Leaves, two of a fig-tree, by experiment, imbibed from the earth, two pounces of water in five hours and a half, i. 195

Leech, different kinds—its description—takes a large quantity of food, vii. 306—has no anus or passage to eject it from the body when digested, 308—in what it differs from the rest of the reptile tribe, 309—the leech used in medicine, 306—a girl of nine years old killed by leeches, 310 best way of applying leeches, 311

Legs, a man without them performed astonishing feats of dexterity, iv. 250

Leming, a bold animal of the rat kind, native of Scandinavia, iv. 84—often pours down in myriads from the northern mountains, and, like pestilence, destroys all the productions of the earth—Laplanders believe they drop from the clouds—their description, 85—they move, in a square, forward by night, and lying still by day—whither their motions are turned nothing can stop them; a fire, a deep well, a torrent does not turn them out of their direction—they never retreat—interrupted by a boat across a river, they go over it, 86—stopped by a stack of hay or corn, they gnaw their way through; and obstructed by an house they cannot get through, continue before it till they die—eat nothing prepared for human subsistence—never enter a house to destroy provisions—passing through a meadow, destroy it in a short time, and leave it with the appearance of being burnt up and strewed over with ashes—a man imprudently attacking one of them, the animal furiously flies at him, barking something like a puppy, fastens, and does not easily quit its hold, 87—their leader forced out of the line after a long defence, and separated from the rest, sets up a plaintive cry, not of anger, and hangs itself on the fork of a tree—they destroy and devour each other—after incredible devastations, they separate into armies, opposed with deadly hatred, and move along the coasts of the larger lakes

and rivers—the Laplanders form prognostics from the manner of their arrangement—what prognostics—the divisions—continue their engagements and animosity until one party be overcome; then they disappear, 87—and it is supposed that having nothing to subsist on, they devour each other—their carcases sometimes infect the air for miles round, and produce malignant disorders—they seem also to infect the plants, the cattle often dying in the places where they passed—the male larger and more beautifully spotted than the female—are extremely prolific—breeding does not hinder their march, some carrying one young in their mouth and another on their back—are greatly preyed upon by the ermin, and even by the rein-deer, 89—dogs and cats detest their flesh, but the Laplanders esteem it good eating, and devour it greedily, 90

Leo, the emperor, granted the nations in possession of the shore the sole right of fishing before their respective territories, i. 232

Leona (*Sierra*) a kind of apes in that province of Africa called baris, properly instructed when young, serve as useful domestics, iv. 198

Leopard, the large, and the leopard or panther of Senegal—differences between those animals, iii. 251—leopard will not fly at the approach of the lion, 226—the American is neither so fierce nor so valiant as that of Africa and Asia, ii. 332

Lepadogaster, description of this fish, vi. 306

Leprosy, in what manner the Indians endeavour to prevent the Arabian leprosy, or the elephantiasis, a disease to which man and the elephant are equally subject, iv. 265

Lerot, the middle dormouse, according to Mr. Buffon, iv. 76

Leymmer, a dog of the generous kind, iii. 286

Libella, the dragon-fly—general characteristics, 316—eggs, 317—food of the young, 318—how they prepare to change from the reptile to the flying state—description, 319—the strongest and most courageous of all winged insects, 320—the business of impregnation, how performed, 321

Libya, the greatest of the serpent kind, vii. 173

Lichen rangiferinus, the food of the rein-deer, a moss in Lapland of two kinds; the white in the fields, and the black on the trees, iii. 154

Lidme, name of the eleventh variety of gazelles, by Mr. Buffon, iii. 79

Life, formerly supposed producible only by oviparous and viviparous generation; but later discoveries induce many to doubt whether animal life may not be produced merely from putrefaction, ii. 22—the beginning of our lives, as well as the end, is the same in most countries, 202—the most marked with anguish, 48—that of infants very precarious till the age of three or four—instances of it, 59—the duration of life in general nearly the same in most countries, 202—the most useless and contemptible of all others, and the most difficult to destroy, viii. 173

Light, the hand exposed to broad day-light for some time, then immediately snatched into a dark room, will still be luminous and remain so for some time, and why—dangerous to the sight to look steadily upon bright and luminous objects and why, iii. 159—such persons as read or write for any continuance should choose a moderate light, ii. 160

Light sent forth by the glow-worm, how produced hitherto inexplicable, viii. 141—sent forth by the star-fish resembles that of phosphorous, 175

Lightening is an electrical flash produced by the opposition of two clouds, i. 374—of the torrid zone is not so fatal or so dangerous as with us, otherwise, those regions would be uninhabitable, 379—flashing without noise illuminates the sky all round in the torrid zone, 377

Lights, northern lights illuminate half the hemisphere, i. 377

Limits, of the inhabitants near the poles are sometimes frozen and drop off, i. 387—some animals live without, and often are seen to produce them, viii. 170

Lime, manner of making it in Persia, i. 86

Line, upon the approach of winter months under the line, the whole horizon seems wrapt in a muddy cloud, i. 378—in America, all that part of the continent which lies under the line is cool and pleasant, ii. 233—in general, as we approach the line, we find the inhabitants of each country grow browner, until the colour deepens into perfect blackness, 235

Linnaeus, the celebrated naturalist, supposes man a native of the tropical climates, and only a sojourner more to the north—argument to prove the contrary, ii. 240—his method of classing animals, 298—makes the female of the bat a primas, to rank it in the same order with man, iv. 138

Linnet, a bird of the sparrow-kind, v. 315—taught to whistle a long and regular tune, 345

Lion, produced under the burning sun of Africa, is the most terrible and most undaunted creature, iii. 214—description of this noble animal, 219—to 222—he degenerates when removed from the torrid zone, 213—to compare the strength of the lion with that of man, it should be considered that the claws of this animal give a false idea of its power, ascribing to its force what is the effect of its arms, ii. 111—leaps twenty feet at a spring, 322—a single lion of the desert often attacks an entire cavern, 216—he crouches on his belly, and continues so with patient expectation, until his prey comes within a proper distance, 223—the female has no mane, 221—his roaring is so loud, that when heard in the night, and re-echoed by the mountains, it resembles distant thunder, 224—does not willingly attack the horse, and only compelled by the keenest hunger, ii. 319—combats between a lion and a horse in Italy—the lion stunned and left sprawling, the horse escapes; but the lion succeeding, sticks to its prey, and tears the horse in pieces instantly, 319—attends to the call of the jackall, iii. 337—in countries tolerably inhabited, the lion is cowardly, and often scared by the cries of women and children, 201

Lions, those inhabiting the peopled countries of Morocco or India scared away with a shout—the keepers play with him, plague, and chastise him without a cause; he bears it with composure, but his anger once excited, the consequences are terrible—an instance from Labat, iii. 217—numberless accounts assure his anger noble, his courage magnanimous, and his natural ferocity, seldom exerted against his benefactors—he has spared the lives of those thrown to be devoured by him, afforded them part of his subsistence, and sometimes abstains from food himself to support them, 218—necessity alone makes him cruel, 219—the manner of hunting them by Hottentots and others, 215—horses for hunting them of that sort called charossi, all others fly at the sight of him, 226—the lion prefers the flesh of camels to other food—is also fond of that of young elephants—when old, finding men and quadrupedes together, he attacks the latter, and never meddles with men, unless provoked, 228—manner of copulation, and time of gestation, number brought forth, and time taken to come to perfection, all known, 229—a lion in the Tower of London above seventy years, 230—the lioness fearing her retreat discovered, hides or tracks,

by running back, or brushing them out with her tail, 231—becomes terrible with young ones to provide for, 230—lions, incited by desire, fight bloody battles, till one becomes victorious over the rest, 228—the size of the lion between three and four feet; the female in all dimensions about one-third less—there are properly no lions in America; the *puma* has received the name of the *American lion*, but, when compared, is a very contemptible animal, 332---those of mount Atlas have not the strength or ferocity of those of Biledulgerid or Zaara---species of this animal diminishing daily---Mr. Shaw observes, the Romans carried fifty times as many lions from Lybia in one year, for their amphitheatres, as are in the whole country at this time, 214---the same remark made with regard to Turkey, Persia, and the Indies; where the lions diminish in their number daily, 215 reported that he sustains hunger a long time, but thirst he cannot support---some believe him in a continual fever---he drinks as often as he finds water, and laps it---he requires about fifteen pound of raw flesh in a day---he rather hunts for a fresh spoil, than returns to that he had before---his is offensive, and his urine insupportable, 224

Lion-cat, or *Angora-cat*, a beautiful animal, a native of Syria or Persia, iii. 212

Sea-lion, described in Anson's voyages, regarded as the largest of the seal family, iv. 181

Lipidopus, the garter-fish, its description, vi. 306

Lips, those of the hare and of the squirrel continually move, whether sleeping or waking, iv. 3

Lithophytes, and coralline substances, viii. 192

Litters, in all animals, intermediate litters most fruitful; first and last generally produce fewest and weakest of the kind, ii. 336

Littorales, Latin name for these shells that are cast upon shore, vii. 13

Liver of a shark affords three or four quarts of oil, 243

Lizards, differ from every other class of animals, and from each other, vii. 112---whence the greatest distinction, 115---general characteristics, 116---along the coasts of Guinea their flesh esteemed a delicacy, iii. 298---the water kind changes its skin every fourth or fifth day, vii. 145---sprinkled with salt, the whole body emits a viscons liquor, and the lizard dies in three minutes, in great agonies---the

whole of the kind sustain the want of food in a surprising manner, vii. 146

Cbaucidian lizard of Aldrovandus described, vii. 157

Flying lizard of Java, account of it by Gentil, 157

Loach, the description of this fish, vi. 308

Lobster, a ruminating fish, iii. 5—very voracious, though without warmth in its body, or red blood in its veins, vi. 352—whatever it seizes upon and has life perishes, however well defended; they devour each other, and, in some measure, eat themselves; changing their shell and stomach every year, the old stomach is the first morsel to glut the new, 358—at first sight the head may be mistaken for the tail—its description, iii. 358—the food of the young, vi. 355—the molting season, 356—how they change their shells—many die under this operation, 356—speedy growth of the new shell—and of itself after the change—the claws of unequal magnitude, and why—at certain seasons they never meet without an engagement—wonders this extraordinary creature offers to imagination—are endowed with a vital principle that furnishes out such limbs as have been cut away, 359—varieties of this animal with differences in the claws, little in the habits or conformation—the shell black when taken, but turns red by boiling—common way of taking the lobster, 361

Locust, the great brown locust seen in several parts of England in 1748; in some southern kingdoms they are still formidable—description of this insect, vii. 340—in what manner they take the field—their devastations, 342—are still more noxious when dead, 343—instance of it—account of their devastations in Russia, Poland, Lithuania, and Barbary, 343—transformations, 345—eaten by the natives in many kingdoms of the East; and caught in small nets for that purpose—their taste—are considered as a great delicacy in Tonquin, by the rich and the poor—must have been a common food with the Jews, 347—description of the great *West-Indian locust*, the most formidable, 348

Loir, the greater dormouse, so called by Mr. Buffon, iv. 76

Longevity, persons remarkable for it, ii. 200

Lorenzini, his experiments upon the torpedo, vi. 262

Lori, the longest of all animals, in proportion to its size—description—a native of the island of Ceylon, iv. 241

Loricaria, description of this fish, vi. 307

Lories, a kind of parrot, v. 272

Louse, its description, vii. 270—whether distinguished by the parts of generation into males and females, not yet discovered, 273—the lousy disease frequent among the ancients, —274

Wood-louse, the description, vii. 286—of great use in medicine, 287

Leuwenhoeck, his opinion about the rudiments of animals, ii. 18

Luminous appearance of the waves in the night, the cause, i. 247

Lump-fish, its description, vi. 283—flung into a pail of water, will stick so close to the bottom, that on taking the fish by the tail, the pail and several gallons of water may be lifted—their flesh, 284

Lungs, animals before birth make no use of their lungs, iv. 171—no anatomist has described the lungs of the lamprey, vi. 267—caterpillars have eighteen lungs, and live several days in the exhausted receiver of the air-pump, viii. 14

Lybia, its inhabitants use ostriches as horses—also at Joazeiro—instance of it at the factory of Podore, v. 62

Lyboija, of Surinam, a kind of serpent, thirty-six feet long, vii. 172

Lynx, distinguished from the ounce, and described—first striking distinction between it and those of the panther kind is the tail—each hair of this animal is of three different colours—it is not above the size of the ounce, iii. 257—chiefly met with in the cold countries bordering on the pole, in the north of Germany, Lithuania, Muscovy, Siberia, and North America—those of the new continent are smaller than in Europe—this animal has been called *lupus tervarius*, but for what reason hard to guess—in its nature it exactly resembles the cat, is bigger, and near two feet long, is also bolder and fiercer—more delicate than the cat—resembles the wolf in nothing, except its cry—several reports of the lynx, propagated by ignorance or imposture, 264

Lyffer, strangeness of his theory to explain the invariable motion of winds, i. 342

M.

Macaguo, a kind of monkey described by Mr. Buffon, iv. 233

Macaw, the large kind of parrot, the size of a raven, v. 275

Machinel-tree; in America; its shade fatal, i. 362—no plant will grow under it, ii. 4

Machines, the invention of many has rendered human strength less valuable, ii. 119

Mackarel, described, vi. 302---produces five hundred thousand eggs, in one season, 176—its growth, 334

Madagascar, its natives desire nothing so ardently as to prostitute their wives or daughters to strangers, and for the most trifling advantages, ii. 74—the great bat of that island described, iv. 141

Madder, used by Mr. Belcher to discover the circulation of the blood through the bones, ii. 194

Madness, produced by want of sleep, ii. 135—cured by music—and also caused by it—instance in Henry IV. of Denmark, who in his rage killed his attendants, 176

Maelstrom, Dutch name for a whirlpool, one upon the coast of Norway, considered as most dreadful and destructive, i. 267—the body of water forming this whirlpool, extended in a circle of above thirteen miles, 268

Magellan, (Ferdinand) a Portuguese of noble extraction, first discovered the gigantic race of mankind, towards the extremity of South America, ii. 259—account of this discovery—he was slain upon one of the Molucca islands 260

Magni, an Italian traveller, discovered the remarkable grotto of Antiparos, in the Archipelago, i. 67

Maggot of Buffon, the *cynocephalus*, the last of the ape kind—its description, iv. 207

Magpie, thievish; rings found in the nest of a tame magpie, v. 222—habits and food—when satisfied for the present, it lays up the remainder for another time, 238—places where it builds, and nests described, 240—number of eggs—in its domestic state, preserves its natural character strictly—foolish custom of cutting its tongue to teach it to speak—puts the animal to pain, and baulks the intention, 241

Mahometans, considering the hare an unclean animal, religiously abstain from its flesh; iv. 14

Maimon, the last of the baboons, Edwards calls it the *pigtail*—its description—native of Sumatra, does not well endure the rigours of our climate, iv. 215

Maire, (James Le) a traveller who confirms the existence of giants in America, ii. 261

Maki, the last of the monkey-kind, iv. 188—their description—many different kinds of these animals, 239

Malabar, land and sea breezes upon those coasts, i. 351

Malacopterigii, the barbarous Greek name given to the soft-finned fish; the prickly-finned sort termed *Acanthopterigii*, vi. 299

Malaballo, a very considerable volcano in South America, i. 99

Malebranche, grounds his beautiful theory of monstrous productions upon a famous instance related by him; and some theory from which he deduces the effects of imagination upon the foetus, ii. 245

Malbrouk, a monkey of the ancient continent, iv. 233—its description—the Bramins have hospitals for such as are sick, or disabled, iv. 234

Maldivia Islands, have lands in them at one time covered with water, and at another free, i. 279

Mallard, a kind of duck, vi. 128—with very particular faculties for calling, 132

Malpighi, his famous experiment upon the stigmata of caterpillars, viii. 14

Mammouth, its tusks, which are used as ivory, and supposed to belong to the elephant, often weigh four hundred pounds, iv. 282

Man, differences in his species less than in animals, and rather taken from the tincture of the skin than variety of figure—there are not in the world above six distinct varieties in the race of men, ii. 212—first race in the polar regions, deep, brown, short, oddly shaped, savage, 213—second, the Tartar race, olive coloured, middle sized, ugly, robust, 219—third, the southern Asiatics, dark olive, slender shaped, straight black hair, feeble, 223—fourth, the negroes of Africa, black, smooth skin, woolly hair, well shaped, 226—fifth, the Americans, copper colour, straight black hair, small eyes, slight limbed, not strong, 229—sixth the Europeans and bordering nations, white of different tints, fine hair, large limbed, vigorous, 230—endures a greater variety of climates than the lower orders are able to do, and why, i. 319—may be called the animal of every climate, ii. 9—intended naturally to be white, 233—white men resemble our common parent more than the rest of his chil-

dren, 239—a native of the tropical climates, and only a so-
 journeyer more to the north, according to Linnæus—argu-
 ment sufficient to prove the contrary, 240—marriageable in
 the warm countries of India at twelve and thirteen years of
 age, 71—just come into the world gives a picture of com-
 plete imbecility, 52—vain man ventures to excite an audi-
 tor's attention, at the risk of incurring his dislike, 99—as
 man has a superiority of powers over other animals, so is he
 proportionably inferior to them in his necessities—nature has
 made him subject to more wants and infirmities than other
 creatures; but all these wants seem given to multiply the
 number of his enjoyments---and in what manner, 123---
 first sensations of a man newly brought into existence, and
 the steps by which he arrives at reality pointed out by Mr.
 Buffon, 187---in those countries where men are most barba-
 rous and stupid, there brutes are most active and sagacious,
 iv. 231—the only animal that supports himself perfectly e-
 rect---the buttock, in man, different from that of all other ani-
 mals---man's feet also different from those of other animals,
 the apes not excepted---the nails less in man than in any
 animal, ii. 105---said to be tall when from five feet eight
 inches to six feet high, 108---probability that men have
 been, in all ages, much of the same size they are at present
 —many corroborating proofs of this, 265---generally lives
 to ninety or a hundred years, if not cut off by diseases—how
 men lived so much longer in earlier times than at present,
 203—proportionably stronger for his size than any other a-
 nimal---to compare the strength of the lion with that of
 man, it must be considered the claws of the animal give a
 false idea of its power; and ascribe to its force the effects of
 its arms—another manner of comparing the strength of man
 with that of animals, is by the weights which either can
 carry, 111—Dr. Desaguliers speaks of a man able to raise
 two thousand pounds, by distributing the weights in such
 manner that every part of his body bore its share, 112—
 exercised in running, outstrips horses; a stout walker, in a
 journey, walks down a horse, 114---those employed as mes-
 sengers at Ispahan in Persia, runners by profession, go thir-
 ty-six leagues in fourteen hours, 114---every animal endures
 the wants of sleep and hunger with less injury to health than
 man, 124—he cannot, uninjured, live four days without
 eating, drinking, and sleeping, 125—one said to live with-

but food for seven days, 132---requires sleep for double motives, the refreshment of the mental as well as the bodily frame, ii. 134---more difficult for man than any other animal to procure sleep, 136---has a lump upon the wind-pipe, not to be seen in woman, 102---a young man deaf and dumb from his birth, knew nothing of death, and never thought of it till the age of twenty-four, when he began to speak all of a sudden, 176---account of a man ruminating, iii. 6---one, without hands or legs, by practice used his stumps for the most convenient purposes, and performed astonishing feats of dexterity, iv. 250---man dies under wounds which a quadrupede or a bird could easily survive, viii. 170

Manufactures, the woollen manufacture not carried on here till several ages after sheep were propagated in England, iii. 43---unavailing efforts of our kings to introduce and preserve it---the Flemings possessed the art in a superior degree---the inhabitants of the Netherlands improved us in this art, and when, 43---the woollen manufacture supposed for some time decaying amongst us, 44---of stuffs of the wool of the pacos, a considerable branch of commerce in South America, iv. 317

Manati, may indiscriminately be the last of beasts, or the first of fishes---its description---the female has breasts placed forward, like those of women---the tongue so short, some have pretended it has none, iv. 183---never entirely leaves the water, only advances the head out of the stream, to reach the grass on the river sides---it feeds entirely on vegetables---places where found---graze among turtles and other crustaceous fishes, giving or fearing no disturbance---unmolested, they keep together in large companies, and surround their young---bring forth in autumn; and supposed to go with young eighteen months---the manati has no voice nor cry---its intestines are longer, in proportion, than those of any other creature, the horse excepted---the fat which lies under the skin, exposed to the sun, has a fine smell and taste, and exceeds the fat of any sea animal, 185---the heat of the sun does not make it rancid; it tastes like the oil of sweet almonds, and serves every way instead of butter; any quantity may be taken inwardly, having no other effect than to keep the body open---the fat of the tail, boiled, more delicate than the former---the lean takes a long time in boiling, and eats like beef---the fat of the young like pork, and the lean like veal, 186

Mandrill, the largest of the baboon kind—its description—when displeased, weeps like a child—is a native of the Gold Coast, iv. 214.

Mangabey, a monkey of the ancient continent—its description, iv. 234.

Mangrove-tree, that grows down in the water of the Senegal river, i. 220.

Manks-puffin, or *coulterneb*, a small water-fowl, described, vi. 195.

Manyfold, name of the third stomach of ruminating animals, ii. 4.

Map of the bottom of that sea which lies between Africa and America, given by M. Buache, i. 290.

Marcassites, their composition—experiment by way of proof, i. 76.

Mares, their exportation prohibited by law in Arabia, ii. 353—studs in Persia of ten thousand white mares, with hoofs so hard, that shoeing is unnecessary, 355—a law in England, prohibiting the exportation of mares and stallions; and one similar to this obtained so early as the times of Athelstan, 369.

Marikina, a monkey of the sagoin kind, with a mane round the neck, and a bunch of hair at the end of the tail, like a lion, iv. 237.

Mariners, to multiply their numbers, queen Elizabeth enjoined that her subjects should fast from flesh on Fridays and Saturdays, ii. 131.

Marls, different sorts found in a well dug at Marly, i. 57.

Marmoset, only differs in size from the opossum, being less; instead of the bag to receive the young, has only two longitudinal folds, within which the premature young, continue to suck—when first produced not above the size of a bean; but stick to the teat until they arrive at maturity, iv. 247.

Marmout, or *marmotte*, a ruminating animal, iii. 5—a native of the Alps—its description—is easily tamed, readily taught to dance, wield a stick, and obey the voice of its master, iv. 38—it has an antipathy to the dog—strength and agility—ludicrous saying that the Savoyards, the only chimney-sweepers of Paris, have learned their art from the

marmotte they carry about for shew---is apt to gnaw the furniture—other affections of this animal—its food—is cleanly, but has a disagreeable scent—sleeps during winter, 39—form of its hole resembles the letter Y, 42—manner of making it, 41—live together, and work in common to make their habitations snug and convenient—when they venture abroad, one is placed as centinel upon a lofty rock, 43—Mr. Buffon says it does not sleep during winter, is rather in a torpor, a stagnation of all faculties—its heat not more than ten degrees above congelation, 45—the flesh said to have a wild taste, and to cause vomiting—countries where it is found, 48—inhabitants of the Alps do not till winter open its hole—produces but once a year, and brings forth three or four at a time—they grow fast, and their lives not above nine or ten years, 47

Marriage and consummation of the Indians, the husband at ten years old, and the wife at eight; frequently have children at that age, ii. 224

Marriotte, his experiment proves that water acts as a menstruum upon air, i. 369

Marrow, spinal, and the brain, the first seen as begun in the embryo, ii. 146

Marfigli, (Count) his opinion upon corals and sponges, viii. 193

Martin; its description, iii. 367—the most beautiful of all British beasts of prey—its scent a pleasing perfume, 367—the yellow-breasted martin—its fur more valuable than the white-breasted sort—Mr. Buffon supposes them a distinct species, that distinction unnecessary, 368—of all the weasel-kind the most pleasing, 368—feeds as they do, and is fond of honey, 370—seldom meets the wild-cat without a combat, 369—the wild-cat not a match for the martin—kept tame by Gesner and Mr. Buffon—often slept for two days, and then was two or three days without sleeping—the yellow breasted more common in France than England, 369—the white-breasted keeps near houses and villages; the yellow keeps in woods, leads a savage life, iv. 30—its nest generally the tenement of the squirrel, taking possession and killing the owner, 30—seizes also the flying squirrel, iv. 36—in that retreat the female brings forth her young, three or four at a time—and they come with the eyes closed—how she compensates for her deficiency of milk, iii.

371—this animal more common in North America than in Europe—found in all northern parts of the world, from Siberia to China, and Canada—in every country hunted for their furs, very valuable, and chiefly so when taken in the beginning of winter—one part of its skin most esteemed—twelve thousand of these skins annually imported into England from Hudson's-bay, and thirty thousand from Canada—small birds alarm the spot where the dam keeps her young, and direct the hunter in his pursuit, 372

Martin, a bird of the swallow-tribe, v. 346

Marum, cats excessively fond of this plant, iii. 206

Mastiff, one of the three descendants of the shepherd's dog, 283—chiefly a native of England; when transported into Denmark, becomes the little Danish dog, 284—the Dutch mastiff, 286

Mastiff-fox, second variety of foxes, less than the greyhound fox, and, stronger than the cur-fox, iii. 332

Maturity, attained too by slow steps, announces a slow march to old age—as true to other animals as to man and vegetables, ii. 199—sooner arrived at in India than in Europe, 224

Maw, in fishes, possesses the power of digesting, vi. 164

Maximin, (the emperor) a prodigy of strength—several instances of it—by birth a Thracian; from being a simple herdsman he rose by the gradations of office, until he came to be emperor of Rome, was above nine feet in height, and the best proportioned man in the empire, ii. 118—was killed by his own soldiers, while sleeping, 119

May-bug, or dorr-beetle, described, viii. 130—See *Beetle*.

Measled hares, distinguished from mountain hares, they keep in low grounds, their flesh moist, white and flabby, iv. 11

Mechanism, which regulates the number of our years, admits no change in its laws, and can be affected only by long fasting, or great excess, ii. 202

Medauro, the brass helmet dug up there fits a common man, yet is allowed to have been left there at the overthrow of Asdrubal, ii. 265

Media, has pastures in its plains, excellent for rearing horses, ii. 361

Medicine, many of its salutary purposes obtainable from some parts of the ostrich, v. 62—also from many parts of quadrupedes, iii. 69

Mediterranean sea, always receiving, and never discharging water, is no way fuller than before—in what manner some account for this, i. 263—water spouts seen in it—description of them by Tournefort, 390—solutions offered for this phenomenon by Mr. Buffon and Dr. Stuart, 393—this sea one of the smoothest and most gentle in the world, i. 267

Medusa, name given by Linnæus to a small insect, thought the simple food of the great Greenland whale, vi. 197—walfischoas, the name given to it by the Icelanders, 198

Meibomius, has collected some few remains of ancient music, which do not leave room to regret what is lost, ii. 169

Membrane, the nictitating membrane in birds—veils the eye at pleasure, whilst the eye-lid continues open, v. 9

Mendip mines, in Somersetshire, account of them by Mr. Locke, i. 77

Menstruum, that body which is most fluid and penetrating, is likely to be the menstruum of one less so—Mariotte's experiment shews that water will act as a menstruum upon air, 369—cold diminishes the force of menstrua, and often promotes evaporation, 370

Merlin, the smallest of the hawk or falcon-kind, scarce larger than a thrush, displays a degree of courage rendering him formidable to birds far above his size—kills a partridge or a quail at a single pounce from above, v. 122—the pursuit of the lark by a couple of merlins is a most delightful spectacle, 128

Merolla says, the zebra, when tamed, is not less estimable for swiftness than beauty, ii. 397

Metals, the richest, in their native state, much less glittering and splendid than useless marcasites, i. 74—those trades that deal in their preparations, always unwholesome, 326—all pieces swallowed by animals lose part of their weight, and often the extremities of their figure, v. 55

Meteors, between the tropics, and near the poles, assume dreadful and various appearances, i. 377—in those countries where the sun exerts the greatest force in raising vapours,

there are the greatest quantity of meteors, 378—one of a very uncommon kind, seen by Ulloa, at Quito, 383

Method, the principal help in natural history; without it little progress made in this science, ii. 289—the most applauded of classing animals, 294—the author's method of classing them, 301—that of describing all things by words alone, a fault that has infected most of our dictionaries, and bodies of arts and sciences, 307—Mr. Locke has observed, that a drawing of an animal, taken from life, is the best method of advancing natural history, 307

Mew, said of stags when they cast their heads, iii. 114

Mice, have burrowed in the back of hogs, while fattening in the sty, without being felt, iii. 178—and rats cannot endure the scent of the gennet, 388—in 1586, at Hallontide, an army of mice over-ran the marshes near Southminster, and eat up the grass to the roots; but soon after they were all devoured by a number of strange painted owls, v. 146

Mico, the least and most beautiful monkey of the sagoin kind—its description by Mr. La Condamine, iv. 237

Microscope, increases the magnitude of an object, and that of its motion also, ii. 21—the pupil and humours of the eye of the mole discovered by it, iv. 92

Migrating fishes, vi. 318—the herring and the pilchard take the most adventurous voyages, 320—stated returns, and regular progress of the migrating fishes, one of the most extraordinary circumstances in the history of Nature, 318

Migration, causes of migration of birds, v. 32—in what manner they perform them, 35—at what times, 32—rather follow weather than country, and go on as they perceive the atmosphere more suitable to their wants and dispositions—migration of some swallows, and retreat of others into old walls, to avoid the rigour of winter, wrap this subject in great obscurity, 37—of bees, several signs previous to it, viii. 82

Milan, hares bred in the Milanese, thought the best in Europe, iv. 13

Milk, infants have it in their own breasts, ii. 59—sometimes found in the breasts of men, as well as in those of women, 102—in carnivorous animals more sparing than in others, 337—of goats medicinal, and not apt to curdle

upon the stomach as that of the cows, 55—of the reindeer thinner than that of the cow, but sweeter, and more nourishing, 158—boiled up with wood-forrel, by the Laplanders kept in casks under ground, to be eaten in winter, 166—injected into a vein, kills with more certainty than the venom of a viper, 199

Millipides, multiplied by being cut in pieces, ii. 23

Milo, an instance of his strength, when he stood upright, ii. 118

Milton makes Satan personate the cormorant, a most nauseous bird—objection against him on this account—his vindication, vi. 66

Minerals mere inactive and insensible bodies, ii. 4

Miners first become paralytic, then die consumptive, for the trifling reward of seven-pence a day, i. 79—peculiar contrivance to supply light for their operations—make use only of wooden instruments in digging, and take out the nails from their shoes before they enter the mine, 82

Mines, the deepest that at Cotteberg in Hungary, not more than three thousand feet deep, i. 51—a coal-mine in the North of England said to be eleven hundred yards deep, 73—air different in them, proportionably as the magazines of fire lay nearer the centre, 75—other causes of this difference, 76—Mendip lead-mines in Somersetshire—their description, 77—mines of coal generally less noxious than those of tin; tin than those of copper; but none are so dreadfully destructive as those of quicksilver, 78—deplorable infirmities of workmen in the mines near the village of Idra, 79—metallic, often destroys all vegetation by their volatile corrosive fumes—salt mines naturally cold, 83—natives of countries abounding in mines too often experience the noxious effects of their vicinity, 326—in a lead-mine in Flintshire were found two grinding teeth, and part of the tusk of an elephant, at forty-two yards depth, iv. 282

Mingrelians, among the sixth variety of the human species, described, ii. 230

Mint, cats excessively fond of the cat-mint, iii. 206

Mire-drum, the bittern, described, vi. 2—See *Bittern*.

Mistletoe, a plant, thought propagated by seeds voided by birds, v. 316

Mississippi, a great river in North America, i. 216—its source and length—receives forty rivers, 218

Mists continually rise upon the approach of the winter months under the line, 378—called frost-smoke, raises blisters on several parts of the body, in the regions round the poles, 386

Mite-fly, not found in Lapland, iii. 166

Miume, a river in America—enormous skeletons lately discovered near it, iv. 282

Mock-bird, description of the American mock-bird, v. 324—its habits—can assume the tone of every animal in the wood, from the wolf to the raven—no bird in the forest it has not at times deceived by mimicking its call, v. 325

Mock-juns, meteors and other phenomena, in the northern regions, i. 377

Mococo, first of the maki-kind, which is the last of the monkies—its description—a native of Madagascar—its qualities, iv. 239—eats its own tail, and seems to feel no pain—some other monkies do the same, 336

Modena, a city in Italy—its remarkable wells—other rarities round it, i. 282

Mogul, in the Indian language signifies a white man, ii. 224

Mold, black, or garden-earth, the first layer on the surface of the globe—is formed from animal and vegetable bodies decayed—soil fertile, in proportion to the quantity that putrified mold bears to the gravelly mixture, i. 52

Mole, a ruminating insect, or seemingly so, iii. 6—no quadrupede fatter, none with a more sleek glossy skin—an utter stranger in Ireland—formed to live under the earth, iv. 90—its description, 91—the ancients, and some moderns of opinion, that the mole was blind; but Derham, by a microscope, discovered all the parts of the eye known in other animals, iv. 92—a mole let loose in the midst of a field, like a ghost on a theatre, instantly sinks into the earth; and an active labourer, with a spade, pursues it vain, 93—peculiar advantage of the smallness of its eyes, 94—when once buried in the earth, it seldom stirs out—it chuses the looser softer grounds—chiefly preys upon worms and insects—is most active, and casts up most earth, immediately before rain, and in winter, before a thaw—in dry weather, it seldom forms hillocks—readily evades the pursuit of animals stronger and swifter than itself—its greatest calamity is an

inundation—in some places considered by the farmer as his greatest pest—couple towards spring—and the young found about the beginning of May—generally four or five at a time, v. 96—description of the mole-hill, in which the female has brought forth her young, iv. 97—is scarcely found, except in cultivated countries—the varieties are but few—that of Virginia is black, mixed with a deep purple—that of Poland is white—Agriculture says he saw hats made of mole-skins, the finest and most beautiful imaginable, 98

Molossian breed of dogs, and its perfections, set forth by Nemesianus, iii. 294

Molting, annually suffered by birds—its effects, v. 28—artificially accelerated, and how—the manner in which Nature performs the operation, 19—the season commonly obtains from the end of summer to the middle of autumn, 20

Molucca islands, Ferdinand Magellan, a Portuguese of noble extraction, slain upon one of them, ii. 260

Mona, the *cephus* of the ancients, a monkey of the ancient continent—its description, iv. 224

Mona, name given to the marmout in Canada, iv. 48

Mongoose, of the maki-kind, the last of the monkeys—its description—is a native of Madagascar, 210

Monkey, one general description will not serve for all the animals of the monkey-kind, iv. 189—La Condamine asserts it would take up a volume to describe the differences of monkeys found along the river of Amazons, 216—and we are sure that every one of these is different from those on the African coast, 217—an elaborate description of each must be useless and tiresome, their numbers being very great, and their differences very trifling—those of two cantons never found to mix—of all kinds less than the bahoos, have less power of doing mischief, and their ferocity diminishes with their size, 217—do nothing desired without beating; their fears once removed, they are the most insolent head-strong animals in nature—in their native woods, are the pests of other animals, and the masters of the forest where they reside—the tyger, nor the lion will not venture to dispute dominion with creatures, who from the tops of trees with impunity carry on an offensive war, and by their agility escape all pursuit, 219—yet they sometimes fall a prey to the lion in deserts and forests, iii. 223—birds have not less

to fear from their continual depredations—such being their petulant delight in mischief, that they fling the eggs against the ground when wanting appetite to devour them, iv. 216—one only animal in the forest ventures to oppose them, that is the serpent—larger snakes often wind up the trees where they reside, and happening to surprise them sleeping, swallow them whole, before they can make defence—they generally inhabit the tops of trees, and the snakes cling to the branches nearer the bottom, in this manner they are near each other, like enemies in the same field of battle—some supposed their vicinity rather argued mutual friendship—father Labat has seen them playing their gambols upon those branches on which the snakes were reposing, and jumping over them without receiving any injury, iv. 220—they provoke the snake as the sparrows twitter at a cat—when attacked, they shew perfect skill in defending and assisting each other—they regularly begin hostilities against those who enter their woods, iv. 221—they take most desperate leaps, and seldom come to the ground—one being wounded, the rest come round, put their fingers into the wound, as desirous of sounding its depth—the blood flowing in any quantity, some stop it, while others get leaves, chew, and thrust them into the opening—are often killed in numbers before they make a retreat, with the same precipitation as they at first came on—in this retreat the young are clinging to the back of the female, who jumps away, seemingly unembarrassed by the burthen, iv. 222—usual way of taking them alive—the monkey not killed outright, does not fall; but clinging to some branch, continues, when dead, its last grasp, and remains where shot, until it drops by putrefaction, iv. 223—skinned and served up at negroe feasts, so like a child, an European is shocked at the sight, iv. 224—the negroes seeing Europeans buy young and tame monkeys, with equal care brought rats to the factors for sale, and were greatly disappointed finding no purchaser—negroes cannot comprehend advantages arising from educating or keeping animals who come in companies to lay waste fields of corn or rice, or plantations of sugar-canes—they carry off what they are able, and destroy ten times more, iv. 224—manner of their plundering—are under a kind of discipline, exercised among themselves, iv. 225—accounts to this purpose by Morgrave—one species, by Mr. Buffon called the

ouarine, remarkable for loudness and distinctness of voice—use to which they convert it—are generally together in companies, march in exact order, and obey the voice of some chieftain, remarkable for his size and gravity, iv. 226—chief food of the tribe, iv. 227—extraordinary manner of managing an oyster—manner of drawing crabs from the water—no snare, how nicely baited, takes a monkey of the West Indian islands—female brings forth one, and sometimes two at a time—rarely breed when brought into Europe—the male and female never tired of fondling their young, and instruct it with no little assiduity—often severely correct it, if stubborn, or disinclined to profit by their example—manner of carrying their young in the woods, iv. 227—dexterity in passing from one tree to another, by forming a kind of chain, locking tail in tail, or hand in hand, iv. 229—one amused itself for hours imposing upon the gravity of a cat—and playing its pranks among rabbits, iv. 230—faithful services which father Carli received from the monkeys in Angola, where he went to convert the savage natives to Christianity—savages of Africa and America, suppose monkeys to be men; idle, slothful, rational beings, capable of speech and conversation, but obstinately dumb, for fear of being compelled to labour—monkeys of Africa most expert and entertaining, iv. 231—shew a greater degree of cunning and activity—three marks by which monkeys of the new continent are distinguished from those of the old, iv. 232—Mr. Buffon makes but nine species of monkeys belonging to the ancient continent, and eleven to the new—their names, with their descriptions, iv. 232—the *red African*, the *patas*, second sort of the ancient continent, iv. 233—the *white nose*, or *mouffoc*, of the ancient continent, most beautiful—its description—the *green* of St. Jago, also called *callitrix*, is of the ancient continent—its description, iv. 234—some of the kinds eat their own tail, and seem to feel no pain, iv. 336—the Bramins have hospitals for those that happen to be sick, or disabled, iv. 234—those monkeys of the new continent, with muscular holding tails, are called *sapajous*, and those with feeble useless tails, are called *sagoins*, iv. 235—*fox-tailed monkey*, 237—*makis*, the last of the kind—their description, 238

Monkey-bezoar, a factitious concrete, iii. 76. See *Bezoar*.

Monoculus, the arboreſcent water-flea—its deſcription—are of a blood-red colour; and ſometimes in ſuch multitudes on ſtanding waters, as to make them appear all over red, whence the water has been thought turned into blood, vii. 288—its branching arms, and the motions made with them in the water, deſerve great attention, 289

Monſoons, ſo called from a famous Pilot of that name, who firſt uſed them in navigation with ſucceſs—in that part of the ocean between Africa and India thoſe of the eaſt winds begin in January, and end at the commencement of June; in Auguſt, or September, the contrary takes place; and the weſt winds blow for three or four months, i. 347—monſoons prevail at different ſeaſons, throughout the Indies, 348

Monſters, after a catalogue of them, Linnæus particularly adds the ſlender waſts of the women of Europe, ii. 243

Monſtrous productions, father Malbranche's ingenious theory of, ii. 246—remarkable inſtance related by him, 245

Montaigne, well known to have diſliked thoſe men who ſhut one eye in looking upon an object, ii. 94

Mooſe-deer, name in America for the elk, iii. 140—its deſcription, 144

Mormyrus, deſcription of this fiſh, vi. 309

Morocco, the original horſes there, much ſmaller than the Arabian breed, ii. 361

Moron, a kind of ſalamander, thought venomous, vii. 141

Morſe, an animal of the ſeal-kind, might be ranked among the fiſhes, ii. 313—generally frequents the ſame places where ſeals reſide in, iv. 181—different from the reſt in a very particular formation of the teeth—reſembles a ſeal, except that it is much larger—are rarely found, but in the frozen regions, near the pole—formerly more numerous than at preſent; the Greenlanders deſtroyed them more before thoſe ſeas were viſited by European ſhips upon the whale-fiſhery, than now, 181—its teeth generally from two to three feet long—the ivory more eſteemed than that of the elephant—the fiſhers have formerly killed three or four hundred morſes at once; their bones are ſtill lying in prodigious

gious quantities, along those shores they chiefly frequented, 182

Moschetoes, excessive torments caused by them, i. 147—houses forsaken on account of them, 148

Moss, the only support of the rein-deer in Lapland—of two sorts, white and black, iii. 154

Mother-of-pearl, taken from the pearl oyster, vii. 55

Moths, difference from butterflies, viii. 38—all the tribe of female moths lay their eggs soon after they leave the aurelia, 42

Motion, keeps the water of the sea sweet, i. 249—destroys numbers of viler creatures, 250—constant motion of the waters of the sea westward, 259—principal difference between serpentine and vermicular motion, vii. 181—some vegetables possessed of motion, viii. 161—and many animals totally without it—in what manner animals of the worm-kind move, 166

Moufflon the sheep in a savage state, a bold, fleet creature, able to escape from greater animals, or oppose the smaller with arms received from Nature, ii. 39—its description, 50

Mountains, how formed, and for what designed, i. 138—upon our globe considered as angles of small lines in the circumference of a circle, 139—give direction to the courses of the air, 338—rising from places once level, 21—countries most mountainous, are most barren and uninhabitable, 146—some vallies are fertilized by earth washed down from great heights, 162—the more extensive the mountain, the greater the river, 142—tops of the highest mountains bare and pointed, and why, 155—tops of land-mountains appear barren and rocky; of sea-mountains verdant and fruitful, 290—the highest in Africa, those called *of the moon*, giving source to the Niger and Nile in Africa, the greatest and highest under the line—some rise three miles perpendicular above the bottom of the ocean, 146—highest in Asia; mount Caucasus makes near approaches to the Andes in South America, 153—burning in Europe, 89—in Asia, 98—in the Molucca island—in Africa—in America, those of the Andes—those of Arequipa, Carassa, Malahallo and Cotopaxi, 99—description of the latter by Ulloa; and an eruption of it, 100

Mon
except
liar;
nimal
—the
by mil
the ye
night
chiefly
into a
twenty
three
contin
nutely
field-
gainst
mouse,
May
a beau
Mou
have
have
snails,
Muc
ii. 196
Mug
Mul
jack-
stole
tainous
the pre
worth
lives th
ed by
Mul
Mul
12—tw
and sta
Mun
278—
in phyt
of seek

Mouse, the most feeble, and most timid of all quadrupedes; except the Guinea-pig, iv. 72—never rendered quite familiar; though fed in a cage, retains its apprehensions—no animal has more enemies, and few so incapable of resistance—the owl, cat, snake, hawk, weazel, and rat destroy them by millions—brings forth at all seasons; and several times in the year; its usual number from six to ten—these in a fortnight strong enough to shift for themselves—places where chiefly found—Aristotle, having put a mouse with young into a vessel of corn, some time after found an hundred and twenty sprung from that original, 73—its life lasts two or three years—the species found in all parts of the ancient continent, and has been exported to the new—Gesner minutely describes the variety of mouse-traps—long-tailed field-mouse, 74—short-tailed field-mouse—has a store against winter, a bushel at a time—a description of the shrew-mouse, 75

Mousteo, or *white-nose*, monkey of the ancient continent; a beautiful little animal—its description, iv. 234

Mouth of hares lined with hair—the only animals that have it on the inside, 8—the snails of the trochus kind have none, vii. 33—mouth of garden, water, and sea-snails, 32

Mucous liquor, giving the joints an easy and ready play, ii. 196

Mugil, the mullet, description of this fish, vi. 304

Mule, engendered between a horse and a she-ass, or a jack-ass and a mare, ii. 386—reputed barren, though Aristotle says it is sometimes prolific, 375—inhabitants of mountainous countries cannot do without them—how they go down the precipices of the Alps and Andes—a fine mule in Spain worth fifty or sixty guineas—common mule very healthy—lives thirty years and more, 387—in South America destroyed by a bat called vampyre, iv. 145

Mullus, or *surmulet*, a description of this fish, vi. 302

Multivalve shells, third division of shells by Aristotle, vii. 12—two principal kinds of multivalve shell-fish, moving and stationary, 61

Mummy, formerly a considerable article in medicine, ii. 278—Paræus wrote a treatise on the inefficacy of mummy in physic—counterfeited by the Jews, and how—the method of seeking for mummies, 279—found in the sands of Ara-

bia, in Egypt, in wooden coffins, or in clothes covered with bitumen, 275—remarkable mummy dug up at Auvergne, in France, 283—in injection of petroleum inwardly, and a layer of asphaltum without, suffice to make a mummy, 287

Muraena, the eel, its description, vi. 305

Murena of the ancients, not our lamprey, vi. 265

Muralto, has given the anatomy of the lamprey, but made no mention of lungs, vi. 267

Muscardin, name of the lesser dormouse, by Mr. Buffon, iv. 76

Muscles, to judge of the strength of animals by the thickness of their muscles inconclusive, ii. 120—those of the hare are strong and without fat, iv. 4—the pectoral muscles of quadrupedes trifling in comparison to those of birds—in quadrupedes, as in man, the muscles moving the thighs and hinder parts are strongest, while those of the arms are feeble—in birds, the contrary obtains, v. 8—those of the shark preserve their motion after being separated from the body, vi. 240

Muscle, the shell-fish, its description—its organs of generation are what most deserve to excite our curiosity, vii. 42—it endeavours to become stationary, and to attach itself to any fixed object it happens to be near—its enemies, 44—it is supposed that those threads, which are usually called the beard of the muscle, are the natural growth of the animal's body, and by no means produced at pleasure, as Reaumur supposes, 45—its instrument of motion, by which it contrives to reach the object it wants to bind itself to—its food—some of this kind have been found a foot long, 46—the natives of Palermo sometimes make gloves and stockings of its beards—the places where found—it requires a year for the peopling a muscle-bed, 47

Muscovy-duck, or the *musk-duck*, so called from a supposed musky smell, vi. 128

Music, said, by the ancients, to have been invented from the blows of different hammers on an anvil, ii. 165—from the remains of ancient music, collected by Meibomius, one might suppose nothing powerful in what is lost, 169—in all countries, where music is in its infancy, the half-tones are rejected, 166—many barbarous nations have their instruments of music; and the proportion between their notes is

the same as in ours—all countries pleased with music; and where they have not skill to produce harmony, they substitute noise, 167—its effects, the ancients give us many strange instances of them upon men and animals, 168—and the moderns likewise, 169—madness cured by it—and also excited by it—remarkable instance in Henry IV. of Denmark, 170—it is now well known that the stories of the bite of the tarantula, and its cure by music, are all deceptions—instance of it, 171—fishes are allured by music—horses and cows likewise, 168—the elephant appears delighted with music, iv. 258—father Kircher has set the voices of birds to music, v. 143

Musk, a doubt whether the animal producing it be an hog, an ox, a goat, or a deer, iii. 89—no animal so justly the reproach of natural historians as that which bears the musk, 88—it has been variously described, and is known very imperfectly, 90—the description given by Grew, 90—among the numerous medicines procurable from quadrupeds, none, except the musk and hartshorn, have preserved a degree of reputation, 69—formerly in high request as a perfume, 93—has for more than a century been imported from the East, 88—is a dusky reddish substance, like coagulated blood—a grain of it perfumes a whole room—its odour continues for days; without diminution, and no substance known has a stronger or more permanent smell, 89—in larger quantity it continues for years; and scarce wasted in weight, although it has filled the atmosphere to a great distance with its parts, 90—the bags of musk from abroad supposed to belong to some other animal, or taken from some part of the same, filled with its blood; and enough of the perfume to impregnate the rest, 92—it comes from China, Tonquin, Bengal, and often from Muscovy—that of Thibet reckoned the best, and of Muscovy the worst, 93

Musk-rat, three distinctions of it, iv. 78—it is called *stinkard* by the savages of Canada, 80

Musky smell does not make the characteristic marks of any kind of animals, iii. 32

Musmon, or *mufflon*, resembles a ram, its description, iii. 49

Myoides, a broad thin skin, covering the whole upper fore-part of the body, its effect in women with child, ii. 104

N

Nails, how formed in man, ii. 101—those of some of the learned men in China longer than their fingers—savages that let them grow long, use them in slaying animals, 106

Nanquin, a river in Asia, receives thirty rivers, i. 217

Narwhale, the sea unicorn—its description, vi. 207—errors concerning the teeth of this animal—the most harmless and peaceful inhabitant of the ocean—the Greenlanders call it the forerunner of the whale, and why, 208—its food, 210—is a gregarious animal—a century ago its teeth considered the greatest rarity in the world—were believed to belong to a very different animal, 211—for some time after the narwhale was known, the deceit was continued, 212—they far surpass ivory in its qualities, vi. 209

Natalian goat, a remarkable variety in the goat-kind, iii. 57

Nature lavish of life in the lower orders of creation, ii. 49—has left no part of her fabrick destitute of inhabitants, v. 1—has brought man into life with more wants and infirmities than the rest of her creatures, ii. 123—and by supplying a variety of appetites, has multiplied life in her productions, v. 79—in a course of ages shapes herself to constraint, and assumes hereditary deformity—instances of it, ii. 238—has contracted the stomachs of animals of the forest, suitable to their precarious way of living, 124—what might have led some late philosophers into the opinion that all Nature was animated, viii. 199—she has kindly hid our hearts from each other, to keep us in good humour with our fellow-creatures, ii. 95

Nautilus, a sea-snail, most frequently seen swimming—its shell very thin, and easily pierced, vii. 35—its description, 36—it is certain that it sometimes quits its shell, and returns to it again—peculiarity for which it has been most distinguished, 37

Nazarith bird, whether the dodo or not, is uncertain, v. 78

Neck, fishes have none—birds, in general, have it longer than any other kind of animals, ii. 102—in women, it is proportionably longer than in men, 107

Nectarium, the part of a flower from which the honey is extracted, viii. 75

Negroes of the Leeward islands, by the smell alone, distinguish the footsteps of a Frenchman from those of a negroe, ii. 180—several of them have white beards, and black hair—described—their features not deformed by art, 227—the women's breasts, after bearing one child, hang down below the navel, and are thrown over the shoulders to suckle the child at their backs, 228—the jet black claim the honour of hereditary resemblance to our common parent—an argument sufficient to prove the contrary—two white negroes the issue of black parents, 240—shew their terror and surprise, when they first see a horse, 346—of the African coasts regard the bat with horror, and will not eat it though ready to starve, 141—happy to see numbers of monkeys destroyed, because they dread their devastations, and love their flesh, 223—cannot comprehend advantages arising to Europeans from educating or keeping monkeys—and having seen young and tame monkeys bought, have offered rats for sale to our factors, and been greatly disappointed at finding no purchaser, 224—distractedly fond of the flesh of the shark, vi. 243—their manner of killing it, 241.

Negroland, or Nigritia, the plague not known in it, i. 328—its inhabitants are the darkest of all blacks, ii. 235

Nerves, wherever they go, or send their branches in number, these parts are soonest begun, and most completely finished, ii. 146

Nesi, or Nethe, a river, near Bruges, in Flanders—great quantities of trees found in its mouth, at the depth of fifty feet, i. 281

Nest, of every species of birds has a peculiar architecture—where eggs are numerous, the nest must be warm, v. 24—different places which birds chuse for their nests, 25—description of the nest of an eagle found in the Peak of Derbyshire, v. 93—of the bald eagle, large enough to fill the body of a cart, 96—hanging nests in Brasil, 254—made in such a manner, as to have no opening but at the bottom, 256—the Chinese get those of the swallows from the rocks, and sell them in great numbers in the East-Indies, where they are esteemed great delicacies, and eat dissolved in chicken, or mutton broth, 350—that of the wasp one of the most curious objects in natural history—its description, viii. 97

Netherlands, their inhabitants improved us in the woollen manufacture, iii. 44

Nettles, how used to teach capons to clutch a fresh brood of chickens throughout the year, v. 169

Nettles of the sea, name given by some to the star-fish, viii. 175

New Providence, one of the Bahama islands—the philosophical transactions give account of poisonous qualities in the fish found on the coast of this island—all kinds at different times dangerous; one day serving for nourishment, and the next proving fatal, vi. 343

Nicola Pesce, a celebrated diver—his performances related by Kircher, i. 293—he often swam over from Sicily into Calabria, carrying letters from the king—frequently known to spend five days in the midst of the waves, without any other provisions than the fish he caught there, and eat raw, 294

Nieper, or Boristhenes, a river rising in the middle of Muscovy, and running three hundred and fifty leagues to empty itself in the Black Sea, i. 210

Niger, this river has a course of several hundred miles from its source, at the mountains of the moon, i. 142—confidently asserted that it is lost before it reaches the ocean, 225

Nightingale, a bird of the sparrow-kind, v. 314—description of its melody by Pliny, v. 326—its residence—for weeks together, undisturbed, it sits upon the same tree, 328 its nest, and eggs, 328—its song in captivity not so alluring, 329—Gessner says it is possessed of a faculty of talking—story related by him in proof of this assertion, v. 329—its food, and in what manner they must be kept, 336—manner of catching the nightingale, and of managing them when caught, 337—the black-cap called by some the mock-nightingale, 335

Nile, its course, i. 212—its sources ascertained by missionaries—takes its rise in the kingdom of Goïam—receives many lesser rivers—Pliny mistaken, in saying that it received none, 213—the cause of its annual overflowings—time of their increase and decrease more inconsiderable now than in the time of the ancients, 214

Noise, the mind predisposed to joy, noise fails not to increase it into rapture—and those nations which have not skill enough

to produce harmony, readily substitute noise—loud and unexpected, disturbs the whole frame, and why, ii. 167

Noort (Oliver Van) a traveller who confirms the existence of giants, ii. 261

Norfolk, along its coasts, the sea has gained fifty yards in some places, and lost as much in others, i. 277

Norway, the last history of that kingdom does not intimate that asses have yet reached that country, ii. 385—the isatis, a species between the dog and the fox, found in this country, iii. 340—the first great bank for herrings was along these shores, vi. 325—there are lands in it at one time covered with water, and another free, i. 279—the sea has formed several little islands from its main land, 278

Nose, that of the Grecian Venus, such as would appear at present an actual deformity, ii. 76—the form of the nose, and its advanced position, peculiar to the human visage—among the tribes of savage men, the nose is very flat—a Tartar seen in Europe with little more than two holes through which to breathe, 89—whence originally may have come the flat noses of the blacks, 239

Nostrils, wide, add a great deal to the bold and resolute air of the countenance, ii. 89—of the cetaceous tribe, vi. 184—two in the great Greenland whale, 195

Note of the sloth, according to Kircher, an ascending and descending hexachord, uttered only by night, iv. 347

Notonecta, the common water-fly—swims on its back, to feed on the under-side of plants growing in water, vii. 359

Numbness produced by the touch and shock of the torpedo described, vi. 258—conjectures concerning the cause of it, 260—more fish than this of the ray-kind possessed of the numbing quality—this quality said to continue in one kind of the torpedo after it is dead; and the very skin possessed of this extraordinary power till it becomes dry, 263.

Numidia, the plague not known in it once in an hundred years, i. 328—its race of horses much degenerated, ii. 356

Numidian bird; or guinea-hen, described, v. 192

Numidian crane—its peculiar gestures and contortions, v. 391

Nux vomica, ground and mixed with meal, the most certain poison, and least dangerous, to kill rats, iv. 70—fatal to most animals, except man, 170

Nyl-ghaw, an animal between the cow and the deer, native of India—its description, iv. 318—disposition and manners of one brought over to this country, 319—its manner of fighting—at all our settlements in India they are considered as rarities, 320

O

Oaks of Hatfield Chase Levels, as black as ebony, very lasting and close-grained, sold for fifteen pounds a-piece, i. 285

Objects, we see them in an inverted position, ii. 147—not the feeling only, but the colour and brightness of objects, contribute to form an idea of the distance at which they appear, 156—the power of seeing objects at a distance rarely equal in both eyes, 157—in near-sighted persons the best eye sees every object the largest, 158

Oby, in Tartary, a river of five hundred leagues, running from the lake of Kila, into the Northern Sea, i. 210—receives above sixty rivers, 217

Ocean occupies considerably more of the globe than the land, i. 227—its different names—all the rivers in the world flowing into it, would, upon a rude computation, take eight hundred years to fill it to its present height, 228—the bays, gulphs, currents and shallows of it much better known and examined than the provinces and kingdoms of the earth, and why, 233—opinions concerning its saltness, and that of Boyle particularly, 234—winds never change between the tropics in the Atlantic and Ethiopic Oceans, 340—each has its insects, ii. 7— and its vegetables, 6—savages consider it as an angry deity, and pay it the homage of submission, i. 231—when England loses its superiority there, its safety begins to be precarious, 233

Ocelot, or cat-o'-mountain, its description, iii. 255—of the panther-kind—one of the fiercest, and, for its size, one of the most destructive animals in the world, 262—its unceasing appetite rather for the blood than the flesh of their prey, 263—it generally is on the tops of trees, like our wild cats, 264

Ocotzimtzan, a kind of pigeon, one of the most splendid tenants of the Mexican forests, v. 295

Ochre, the North American Indians paint their skins with red ochre, ii. 336

Odours diffused by the air as the fluid they swim in, i. 334

Ohio, several enormous skeletons five or six feet beneath the surface on the banks of that river, lately discovered, iv. 282

Oil, train-oil the drink of the Laplanders, ii. 216—the oil of the fish called cachelot is very easily converted into spermaceti, vi. 216—the porpess yields a large quantity of it, 224—the liver of the shark affords three or four quarts of oil, 243—by the application of fallad-oil, the viper's bite is effectually cured, vii. 206

Old-man's beard, a kind of moss growing in Brasil, v. 255

Olearius, invited by the monarch of Persia to a sport of wild-asses, ii. 377

Olive colour, the Asiatic of that colour claims the honour of the hereditary resemblance to our common parent—an argument sufficient to prove the contrary, ii. 240

Oliver van Noort, a traveller, confirms the existence of giants, ii. 261

Oliver, (William) the first who discovered that the application of fallad-oil cured the viper's bite effectually, vii. 206

Onager, or the wild ass, is in still greater abundance than the wild horse, ii. 376

Ondatra, one of the three distinctions of the musk-rat, iv. 78—a native of Canada—creeps into holes where others seemingly less cannot follow—the female has two distinct apertures, one for urine, the other for propagation—this animal in some measure resembles the beaver—its manner of life during winter, in houses covered under a depth of eight or ten feet of snow, iv. 78—savages of Canada cannot abide its scent, call it stinkard—its skin very valuable, 80

Onza, or ounce, of the panther-kind, iii. 254—the onza of Linnaeus, 255

Ophiæum, the gilt head, by sailors called the dolphin, its description, vi. 300

Opposum, an animal in North and South America, of the size of a small cat, and of the monkey-kind, iv. 148—its

description, 232—the female's belly found double—when pursued, she instantly takes her young into a false belly nature has given her, and carries them off, or dies in the endeavour, ii. 336—a minute description of it—the young, when first produced, are very small, and immediately on quitting the real womb, they creep into the false one, but the time of continuance is uncertain—Ulloa has found five young hidden in the belly of the dam, alive and clinging to the teat, three days after she was dead, iv. 243—chiefly subsists upon birds, and hides among the leaves of trees, to seize them by surprise, 246—cannot run with any swiftness, but climbs trees with great ease and expedition—it often hangs by the tail, and for hours together, with the head downwards, keeps watching for its prey—by means of its tail, flings itself from one tree to another, hunts insects, and escapes its pursuers, 246—eats vegetables as well as animal substances—is easily tamed, but a disagreeable domestic, from its stupidity, figure, and scent, which, though fragrant in small quantities, is ungrateful when copious, 247—during its gestation, the bag in which the young are concealed may be opened and examined without inconvenience; the young may be counted and handled; they keep fixed to the teat, and cling as firm as if they made a part of the body of the mother, 264.

Orange-flowers, particularly grateful to the taste and smelling of the elephant, iv. 259

Orb, description of the sea-orb, also called the sea-porcupine—is absolutely poisonous, if eaten, 287

Ore of tin is heavier than that of other metals, i. 74—the basest ores in general the most beautiful to the eye, 75

Organs of digestion, in a manner, reversed in birds, v. 16

Organs of generation in fishes, vi. 177

Orifices, or different verges of snails, vii. 31

Original, French name of the American elk, iii. 144

Orkney Islands, on their shores, the sea when agitated by storms, rises two hundred feet perpendicular, i. 271—a law in those islands entitles any person that kills an eagle to a hen out of every house in the parish in which it is killed, v. 92

Oronoko, a river in South America, its source and length, i. 216

Ortolan, a bird of the sparrow-kind, v. 315

Osprey, its flesh is liked by many, and, when young, an excellent food according to Belonius, v. 85—it chiefly lives upon fish, 95—its distinctive marks, 98

Ostiac Tartars, a race that have travelled down from the North, ii. 219

Ostracion, a fish of the cartilaginous kind, is poisonous, vii. 291

Ostrich, the greatest of birds, makes near approaches to the quadrupede class, v. 40—its description—appears as tall as a man on horse-back—brought into England above seven feet high, 49—surprising conformation of its internal parts, 52—a native only of the torrid regions of Africa—its flesh proscribed in scripture as unfit to be eaten, 33—not known to breed elsewhere than where first produced—places they inhabit—the Arabians say it never drinks—will devour leather, glass, hair, iron, stones, or any thing given, 54—in native deserts, leads an inoffensive social life—They not affirm the male keeps to the female with connubial fidelity—thought much inclined to venery—some of their eggs weigh fifteen pounds—season for laying depends on the climate where the animal is bred, 56—these birds very prolific, and lay from forty to fifty eggs at one clutch—none has a stronger affection for her young, nor watches her eggs with greater assiduity, sits on them, like other birds, male and female by turns, 57—assiduous in supplying the young with grass, and careful to defend them, encountering every danger boldly—way of taking them among the ancients—the plumes used in their helmets—the ladies of the East use them as ornaments in their dress—plumes used in Europe to decorate our hearsees and hats—feathers plucked from the animal while alive more valued than those taken when dead, 58—some savage nations of Africa, hunt them for their flesh—Heliogabalus had the brains of six hundred dressed in one dish—a single egg sufficient entertainment for eight men—eggs well tasted, and extremely nourishing—Apicius gives a receipt of sauce for the ostrich—of all chaces, that of the ostrich, though most laborious, the most entertaining, 59—manner in which the Arabians hunt them, ii. 348—use they make of its skin—method of hunting of the Struthophagi—its blood mixed with the fat a great dainty with the Arabians—inhabitants

of Dara and Lybia breed flocks of them, 61—tamed with little trouble—prized for more than feathers in this domestic state—often ridden upon and used as horses—Moore assures us he saw a man at Joar travelling upon an ostrich; and Adanson asserts he had two young ostriches, the strongest of which ran swifter than the best English racer, with two negroes on his back, 62—an Arabian horse of the first speed scarcely outruns them, ii. 348—of all animals using wings with legs in running, these are by far the swiftest, 60—parts of it convertible to medicinal purposes, 62—eggs, worst of all to be eaten according to Galen, 63—the American ostrich, v. 64

Orris of roses, a modern perfume, valued for its vegetable fragrance, iii. 394

Otter, the link between land amphibious animals, resembles terrestrial in make, and aquatic in living—swims faster than it runs—is brown, and like an overgrown weasel—its description, iv. 149—voracious animal, found near lakes—not fond of fishing in running water, and why—when in rivers, always swims against the stream, to meet rather than pursue the fish it preys upon—in lakes, destroys more than it devours, and spoils a pond in a few nights—tears to pieces the net of the fishers, 150—two different methods of fishing practised by it—infests the edges of lakes with the dead fish it leaves, 151—often distressed for provision in winter, when lakes are frozen, and then obliged to live upon grass, weeds, and bark of trees—its retreat the hollow of a bank made by the water—there it forms a gallery several yards along the water—how it evades the fowler, 152—time of coupling—description of its habitation, 152—way of training it up to hunt fish, and, at the word of command, drive them up to the corner of a pond, seize the largest, and bring it in its mouth to its master—to take an old otter alive not easy—few dogs dare to encounter it, 153—marks of its residence—bites with great fierceness, and never lets go its hold—brings forth its young under hollow banks upon beds of rushes, flags, or weeds, 154—manner of taking the young alive—how fed when taken, 155—continues long without food, 152—couples about midsummer in Europe, and bringa forth at nine weeks and, three or four at a time, 153—some dogs trained up to discover its retreat, 155—otters met with in most parts of the

world—in North America and Carolina found white, inclining to yellow—description of the Brazilian otter, 156

Ovale, foramen, in the embryo, a passage for the blood from the right cavity of the heart to the left and the great artery, ii. 45—it closes when the lungs begin their function, 47—it never closes in the seal's heart, iv. 171

Ovaria, two glandular bodies near the womb, resembling the cluster of small eggs found in fowls, ii. 17

Ouarine species of monkeys so called by Mr. Buffon; remarkable for the loudness of their voice, and the use to which they apply it, iv. 226

Oviparous animals, distinguished from the viviparous, the two classes for generation; all other modes held imaginary and erroneous, ii. 22

Ouran-outang, the wild man of the wood, an animal nearly approaching the human race, is the foremost of the ape-kind—this name given to various animals walking upright; but of different countries, proportions, and powers—the troglodyte of Bontius, the drill of Purchas, and the pigmy of Tylon, have received this general name, iv. 189—its description in a comparative view with man, iv. 191—gigantic races of it described by travellers truly formidable—many are taller than man, active, strong, intrepid, cunning, lascivious, and cruel—countries where found—in Borneo the quality course him as we do the stag, and this hunting is a favourite amusement of the king—runs with great celerity—its description, 200—Battel calls him pongo; assures us that in all he resembles man, but is larger to a gigantic state—a native of the tropical climates—he lives upon fruits, and is not carnivorous—goes in companies; and this troop meeting one of the human species without succour, shew him no mercy—they jointly attack the elephant, beat him with clubs, and force him to leave that part of the forest they claim as their own, 201—is so strong, that ten men are not a match for him—none of the kind taken but very young—one of them dying, the rest cover the body with leaves and branches—a negro boy taken by one of these, and carried into the woods, continued there a whole year without any injury—they often attempt the female negroes going into the woods, and keep them against their wills for their company, feeding them plentifully all the

time—a traveller assures, that he knew a woman of Loam, go that lived among them for three years—they build sheds, and use clubs for their defence, 202—sometimes walk upright, and sometimes upon all fours, when fantastically disposed, 203—though it resembles man in form, and imitates his actions, it is inferior in sagacity even to the elephant or the beaver, 204—two of these creatures brought to Europe discovered an astonishing power of imitation, sat at table like men, eat of every thing without distinction, made use of knife, fork, and spoon, drank wine and other liquors—the male of these two creatures being sea-sick, was twice bled in the arm; and afterwards, when out of order, he shewed his arm as desirous of relief by bleeding, 197—another was surprisingly well behaved, drank wine moderately, and gladly left it for milk or other sweet liquors—it had a defluxion upon the breast, which increasing caused its death in the space of one year from its arrival, 196

Ounce, or *onza*, iii. 254—distinguished from the panther, the ounce of Linnaeus, 255—remarkable for being easily tamed, and employed all over the East for the purposes of hunting, 85—does not pursue by the smell like the dog-kind, 261—the hyena attacks it, and seldom fails to conquer, 343—one at present in the Tower of London, with which the keeper plays without the smallest apprehension, 260—manner of hunting with it, 261

Owl, common mark by which all birds of this kind are distinguished from others—general characteristics of birds of the owl-kind, v. 137—the screech-owl, and its distinctive marks, 86—though dazzled by a bright day-light, they do not see the best in darkest nights, as imagined, 138—seasons in which they see best—nights of moon-light the times of their successful plunder—seeing in the night, or being dazzled by day, not alike in every species of this kind, 139—instances in the white, or barn-owl, and in the brown-horn owl—description of the great horned owl, 140—description of the common horned owl, 85—names of several owls without horns, 141—these horns nothing more than two or three feathers that stand up on each side of the head over the ear, 140—times of making their excursions—places where found in the day-time,

142—
sic, ha
most t
what
birds
day-ti
an up
til ever
pay de
unconc
feiting
ed owl
for tra
horned
owl tak
eggs—
prey,
in ridd
voured
are shy
—the
dies of
146
Ox;
it grow
in the
growth
Oxni
produc
Oyste
—the
growing
other
deposi
and oth
tasted,
romand
nage an
sters, i
internal

Paca
South

142—father Kircher having fet the voices of birds to music, has given all the tones of the owl note, which make a most tremendous melody, 143—sometimes bewildered—what they do in that distress, 144—aversion of small birds to the owl—how they injure and torment him in the day-time—an owl appearing by day sets a whole grove into an uproar, 143—small birds sometimes hunt the owl until evening, when recovering sight, he makes the foremost pay dear for their sport, and does not always leave man an unconcerned spectator—sport of bird-catchers, by counterfeiting the cry of the owl—in what manner the great horned owl is used by falconers to lure the kite, when wanted for training the falcon, 144—places where the great horned owl breeds—its nest, and number of eggs—the lesser owl takes by force the nest of some other bird—number of eggs—the other owls build near the place where they chiefly prey, 145—a single owl more serviceable than six cats, in ridding a barn of mice, iv. 146—an army of mice devoured at Hallontide by a number of strange painted owls—are shy of man, extremely untractable, and difficult to tame—the white owl in captivity refuses all nourishment, and dies of hunger—account of Mr. Buffon to this purpose, v. 146

Ox, its eyes are brown, ii. 83—on the fertile plains of India it grows to a size four times as large as the same kind bred in the Alps, 237—one in England sixteen hands high; its growth depends on the richness of the pasture, iii. 13

Oxney, an island near Romney marsh, in what manner produced, i. 275

Oysters bivalved shell-fish, are self-impregnated, vii. 48—the particulars in which they differ from the muscle—growing even amidst branches of the forest, 48—have no other seeming food than the afflux of sea-water—they are deposited in beds where the tide comes in, at Colchester, and other places of the kingdom—these said to be better tasted, 50—amazing size of oysters along the coast of Comandul 51—surprising manner in which monkeys manage an oyster, iv. 227—an horse known to be fond of oysters, ii. 327—the pearl oyster has a large whitish shell, the internal coat of which is the mother-of-pearl, vii. 55

Paca, improperly called American rabbit, an animal of South America—its cry, and manner of eating, iv. 52—

is most like the agouti, yet differs in several particulars---its description---places where generally found, 53---its flesh considered a delicacy, and often skin and all, like a young pig---is seldom taken alive, defending itself to the last extremity---persecuted not only by man, but by every beast and bird of prey---breeds in such numbers, the diminution is not perceptible, 54

Pachema deserts, where the formidable bird condor is chiefly seen, men seldom venture to travel---hissing serpents, and prowling panthers, being the scattered inhabitants, v. 105

Pacific-sea, the winds never change in it, i. 340

Pacos, a kind of camel in South America---its wool very valuable, iv. 317

Paddock-moon, the silence of frogs in dry weather, may serve to explain an opinion, that there is a month in the year so called, in which they never croak, vii. 88

Pain, nothing but repeated experience shews how seldom pain can be suffered to the utmost, ii. 208

Painters never fully imitate that bold relieve, which both eyes give to the object, ii. 150

Palens often the effect of anger, and almost ever the attendant of fright and fear, ii. 93

Palm-tree, the elephant eats the shoots, leaves, and branches, to the stump, iv. 259---its juice drank by the rousette, or the great bat of Madagascar, 142

Pambamarca, mountain at Quito in Peru---a very uncommon meteor seen upon it by Ulloa, i. 383

Pangolin, vulgarly the scaly lizard, is a native of the torrid climates of the ancient continent---of all animals the best protected from external injury---its description, iv. 119---at the approach of an enemy, it rolls itself up like the hedge-hog, 120---the tyger, panther, and hyena, make vain attempts to force this animal, when it rolls itself up like the hedge-hog---its flesh is considered by the negroes of Africa as a great delicacy, 121---it has no teeth---lives entirely upon insects---there is not a more harmless inoffensive creature than this, unmolested---cunning in hunting for its prey---chiefly keeps in the obscure parts of forests, 123---its tongue, when extended, is shot out to above a quarter of a yard beyond the tip of the nose, 122---countries where found, 124

Pa
many
thero
two,
forme
or lev
260---
attenc
Pa
being
Pa
learn
---err
given
fully
why,
their
bird,
where
and a
the s
times
by th
paid
flock
the f
261---
them
hot i
them
bird
cover
kind,
Pa
that
beau
281.
Pa
hund
i. 21
Pa
less

Panther, the foremost of the mischievous spotted kind, by many naturalists mistaken for the tyger, iii. 250—the panther of Senegal—the large panther—difference between these two, 251—that of America, or jaguar, compared with two former, 252—sometimes employed in hunting—the gazelle, or leveret, are its prey—it sometimes attacks its employer, 260—it naturally hunts the sheep and the goat, ii. 320—attends to the call of the jackall, iii. 337

Par, a peasant, lived to a hundred and forty-four; without being abstemious, ii. 201

Paradise-bird, few have more deceived and puzzled the learned than this—it is an inhabitant of the Molucca islands—erroneous reports concerning this bird, and what has given rise to them—the native savages of those islands carefully cut off its legs before they bring it to market; and why, v. 257—two kinds of the bird of Paradise, v. 258—their distinction from other birds—the description of this bird, 259—found in great numbers in the island of Aro; where the inhabitants call it God's bird—live in large flocks, and at night perch upon the same tree—are called by some, the swallows of Ternate; and, like them, have their stated times of return, 260—their king distinguished from the rest by the lustre of his plumage, and the respect and veneration paid to him—killing the king, the best chance of getting the flock—the chief mark to know the king is by the ends of the feathers in the tail, having eyes like those of the peacock, 261—a number of these birds taken, the method is to gut them, cut off their legs, dry the internal moisture with a hot iron, and fill the cavity with salt and spices, then sell them to the Europeans for a mere trifle, 262—how this bird breeds, or what number of its young; remains for discovery, 261—for beauty it exceeds all others of the pie-kind, 260

Parakeets, a kind of parrot of a lesser size, v. 273—of that kind in Brasil, Labat assures us, there are the most beautiful in plumage, and the most talkative birds in Nature, 281. See *Parrot*

Parana, a river in South America, wherewith at eight hundred leagues from its source, the Plata runs to its mouth, i. 216

Parafina, name given by the Italians to a fishing line, not less than twenty miles long---baited with ten or twelve

thousand hooks, and sunk to the bottom along the coast in the Mediterranean for that fishing called the *pelago*, vi. 254

Parasite, plants, not able to support themselves, grow and fix upon some neighbouring tree, ii. 10

Pard, name given by Linnæus to the panther, iii. 250

Pardalis, another name Gesner gives the panther, iii. 250

Parrot, the middle or second size of the kind, described, v. 272---the ease with which this bird is taught to speak, and the number of words it is capable of repeating are surprising---a grave writer affirms, that one of these was taught to repeat a whole sonnet from Petrarch---the author has seen one taught to pronounce the ninth commandment articulately, 270---account of a parrot belonging to king Henry VII. which fell into the Thames crying, *A boat, twenty pounds for a boat*; 271---Linnæus makes its varieties amount to forty-seven; Brisson extends his catalogue to ninety-five, and the author thinks them numberless---assertion, that the natives of Brasil by art change the colour of a parrot's plumage, 272---peculiarities observed in their conformation; 273---common enough in Europe, will not, however, breed here---loses spirits and appetite during the rigour of winter---instances of sagacity and docility, particularly of the great parrot called *aurous*, 275---their habits---their nests, and the number of eggs, 278---usual method of taking the young---always speak best, when not accustomed to harsh wild notes; 279---what fruit or grain these birds feed upon, their flesh partakes of the flavour and taste---instances of it---seed of the cotton-tree intoxicates them; as wine does man---wine renders them more talkative and amusing; 280---in France very expert; but nothing to those of Brasil, which Clausius says, are most sensible and cunning, 276---natives of Brasil shoot them with heavy arrows, headed with cotton, which knock down the bird without killing it---those of the parakeet tribe are delicate eaters, 280---of this kind in Brasil, Labat assures there are the most beautiful in plumage, and the most talkative possible---are restless and ever on the wing---their habits, 281---their outcry when their companions fall---are very destructive on the coast of Guinea---more than a hundred different kinds counted on the coast of Africa, 282---the white sort called *lories*; 272---countries where found---one, north of the Cape of Good Hope, takes its name from the multitude of parrots in its woods---an

hundred kinds now known, not one of which naturally breeds in countries that acknowledged the Roman power—the green parakeet, with a red neck, was the first of the kind brought into Europe, and the only one known to the ancients from Alexander the Great to Nero, 283—disorders peculiar to the parrot-kind—one well kept will live five or six and twenty years, 284.

Parley, pinks, and birch, hares are particularly fond of, iv. 7.

Partridges, in England, a favourite delicacy at the tables of the rich; whose desire of keeping them to themselves, has been gratified with laws for their preservation, no way harmonizing with the general spirit of English legislation; and why, v. 207—there are two kinds, the grey and the red; the grey is most prolific, and always keep on the ground—the red less common, and perches upon trees—the partridge is found in every country, and climate—in Greenland, where it is brown in summer, becomes white in winter, 208—those of Barakonda are larger legged, swifter of foot, and reside in the highest rocks—partridges of all sorts agree in one character; being immoderately addicted to venery; often to an unnatural degree—the male pursues the hen to her nest, and breaks her eggs, rather than be disappointed—the young having kept in flocks during the winter, break society in spring, when they begin to pair; and terrible combats ensue—their manners otherwise resemble those of poultry, but their cunning and instincts are superior, 209—means the female uses to draw away any formidable animal that approaches her nest—the covies are from ten to fifteen, and, unmolested, they live from fifteen to seventeen years—method of taking them in a net, with a setting dog, the most pleasant, and most secure, 210—they are never so tame as our domestic poultry, 211.

Passage (birds of) causes of their emigrations; v. 32—in one country are not so in others—many of those kinds which at certain seasons leave England, are seen in other climates, never to depart, it is also frequent, that some birds with us faithful residents, in other kingdoms put on the nature of birds of passage—instances of both, 318.

Passions, most of the furious sort characterized from the elevation and depression of the eye-brows, ii. 84—freedom

from passions not only adds to the happiness of the mind, but preserves the beauty of the face, 198

Pastures, those of Great Britain excellently adapted to quadrupeds of the cow-kind, iii. 9

Patas, by some called the red African monkey—its description, iv. 233

St. Paul, in Lower Brittany, in that neighbourhood, lies a tract of land along the sea-side, which before the year 1666 was inhabited, but is now a desert covered with sand, to the height of twenty feet, i. 364

Paunch, name of the first stomach of ruminating animals, iii. 3

Pazan, name of the eighth variety of gazelles, by Mr. Buffon, iii. 74

Peacock, varieties of this bird—some white, others crested—that of Thibet, the most beautiful of the feathered creation, v. 176—a saying among the ancients, as beautiful as is the peacock among birds, so is the tyger among quadrupeds, iii. 233—our first were brought from the East-Indies; and they are still found in flocks in a wild state in the islands of Java and Ceylon—the common people of Italy say it has the plumage of an angel, the voice of a devil, and the guts of a thief—in the days of Solomon we find his navies imported from the East apes and peacocks, v. 171—Ælian relates they were brought into Greece from some barbarous country, and that a male and female were valued at thirty pounds of our money—it is said also, that when Alexander was in India, he saw them flying wild, on the banks of the river Hyarotis, and was so struck with their beauty, that he laid a fine and punishment on all who should kill or disturb them—the Greeks were so much taken with the beauty of this bird, when first brought among them, that it was shewn for money; and many came to Athens from Lacedæmon and Thessaly to see it, 172—once esteemed a delicacy at the tables of the rich and great, 171—Aufidius Hurco stands charged by Pliny with being the first who fattened up the peacock for the feasts of the luxurious, 172—Hortensius the orator was the first who served them up at an entertainment at Rome—and they are talked of as the first of viands—in the times of Francis I. it was a custom to serve up peacocks to the tables of the great, not to be eaten, but seen; in what manner they served them—its flesh is said to keep lon-

ger
barle
food
tiles
up th
is sti
male
will
much
distu
in th
rests
this
year
the k
Baro
of th
175
Se
bed
tion
Pe
i. 99
Pe
at se
it sto
Pe
from
fide o
53—
anim
—th
from
fisher
most
figur
proc
powd
usual
them
Pe
beam
V

ger unputrefied than any other, 173—has a predilection for barley—but as a proud and fickle bird there is scarce any food it will at all times like—it strips the tops of houses of tiles or thatch, lays waste the labours of the gardener, roots up the choicest feeds, and nips favourite flowers in the bud—is still more salacious than the cock, 174—requires five females at least to attend him, and the number not sufficient, will run upon and tread the sitting hen—the pea hen, as much as possible hides her nest from him, that he may not disturb her sitting—she seldom lays above five or six eggs in this climate—Aristotle describes her laying twelve—in forests where they breed naturally, they are very numerous—this bird lives about twenty years—and not till the third year has that beautiful variegated plumage of its tail—in the kingdom of Cambaya, says Taverner, near the city of Baroch, whole flocks of them are in the fields—description of their habits---decoy made use of to catch them there, 175

Sea-peacock, a name given, and by which has been described the Balearic crane, from some resemblance in disposition and manners, v. 388

Peak of Teneriff, its volcano seldom free from eruptions, i. 99

Peak, a noted mountain in the Molucca islands, seen far off at sea, swallowed by an earthquake, and a lake left where it stood, i. 162

Pearl, an animal substance concreted and taking a tincture from the air, vii. 57—found in all bivalved shells, the inside of which resemble that substance called mother-of-pearl, 53—the formation of pearls a disease or an accident in the animal is not known—common opinion upon this subject, 54—the pearl bred from no disorder in the animal *pearl-oyster*, from which the mother-of-pearl is taken, 55—several pearl fisheries—the chief of them in the Persian Gulph, and the most valuable pearls brought from thence—different sizes, figures, and colours, 56—whence their different colours proceed—pearls converted by time and damps into a chalky powder, 57—wretched people destined to fish for pearls—usually die consumptive, 58—in what manner they fish for them, 59

Pearls in stags, are parts rising from the cruit of the beam, iii. 114

Peasants, the meanest of them in Germany, Poland, and Switzerland, kills a cow for his own table, salts and hangs up, and preserves it as a delicacy all the year round, iii. 9

Peccary, or *tajacu*, an animal, a native of America, at first view resembling a small hog—its description—has upon the back a lump like the navel in other animals, iii. 183—it consists of glands producing a liquor of an offensive smell, 184—when killed the parts of generation and the glands on the back must be taken instantly away, otherwise in half an hour the flesh becomes unfit to be eaten, 186—though like the hog in many respects, is nevertheless a distinct race, and will not mix or produce an intermediate race is easily tamed, 188—goes in herds of two or three hundred, and unites, like hogs, in each other's defence, 186—delights not in marshes or mud like our hogs—an unceasing enemy to the lizard, the toad, and the serpent kinds—also feeds upon toads and serpents, 187—any plunderer seizing their young is surrounded, and often killed, 186

Pedigree, the Arabians preserve that of their best horses with great care, and for several generations back, ii. 350

Pegu, a river called the Indian Nile, because of the similar overflowings of its stream, i. 218

Pelagii, the Latin name for those shells fished up from the deep—those cast on the shore are the littorales, vii. 13

Pelican, a ruminating bird, iii. 5—a native of Africa and America; once known in Europe, particularly in Russia—fabulous accounts propagated of it—the description of it, particularly of its bill, and the great pouch underneath, as wonderful—Tertre affirms the pouch will hide fish enough to serve sixty hungry men for a meal—this pouch placed at the top of the gullet, considered as the crop in other birds, vi. 51—the description of the bird from father Labat, 54—indolent habits in preparing for incubation, and defending their young, 56—their gluttony scarcely to be satisfied; their flesh rancid, and tastes worse than it smells—use made by the Americans of their pouches, 57—is not entirely incapable of instruction in a domestic state—in-

stances of it, 58—Aldrovandus mentions one believed to be fifty years old, 59

Penguin, a heavy water-fowl; the wings of this tribe unfit for flight, 89—and their legs still more awkwardly adapted for walking, 90—our sailors call them arse-feet—they dive to the bottom, or swim between two waters—they never visit land but when coming to breed, 91—their colour—are covered more warmly with feathers than other birds—description of the Magellanic penguin, 92—they unite in them the qualities of men, fowls, and fishes—instances of its gluttonous appetite—their food and flesh—are a bird of society, 93—season of laying, and manner of making their nests, 94—some of this tribe called by our seamen the booby—our men first coming among them, were not distrusted nor avoided, they stood to be shot at in flocks, till every one was destroyed—the females let them take their eggs without any resistance, 95—the penguin lays but one egg; in frequented shores—burrows like a rabbit—three or four take possession of one hole, and hatch—one is placed as a centinel to warn of approaching danger, 96—union between this bird and the albatross, and regularity in their building together, 63

Peninsula of India, on one side the coasts are near half the year harrassed by violent hurricanes and northern tempests, i. 348—the people there employ the elephant chiefly in carrying or drawing burthens, iv. 278

Peapark-hole, in Gloucestershire, twenty-five fathom perpendicular depth—its description, from captain Sturme, i. 66

People, so young as fourteen or fifteen often found to cease growing, ii. 79

Pepper, the Indians prefer that devoured and voided unconcocted by the toucan, before the pepper fresh gathered from the tree, v. 244

Perch, a prickly-finned thoracic fish—its description, vi. 302

Perfumes, some physicians think all perfumes unwholesome—our delight in perfumes seems made by habit, ii. 181—many bodies at a distance give an agreeable perfume, and nearer have a most ungrateful odour, 182—no perfume has a stronger or more permanent smell than musk, iii. 89—

the scent of the martin a most pleasing perfume, 367—~~some~~ of the weasel kind have a smell approaching to perfume, 380—that of the musk or the civet, 382—in what manner taken from the pouch, 391—more grateful perfume than musk, 393—that of Amsterdam the purest of any—is communicated to all parts of the animal's body; the fur impregnated, and the skin also—a person shut up with one of the skins in a close room cannot support the scent, 192—this perfume sold in Holland for about fifteen shillings an ounce, 393—it has no analogy with the creature's appetite for generation, 395—a proof of it—has its vicissitudes of fashion, like dress, 394

Persepolis, pastures in the plains about that place excellent for the purposes of rearing horses, ii. 361

Persia, snow falls in abundance upon its mountains, i. 358—the horses of that country the most beautiful and most valuable of all in the East, ii. 361—there are studs of ten thousand white mares together, with the hoof so hard that shoeing is unnecessary, 355—description of the Persian horses by Pietro della Valle, 361—the flesh of the wild asses so much liked that its delicacy is a proverb there, 378—an entertainment of wild asses exhibited by the monarch to Olearius, 377—two kinds of asses there, and some of them worth forty or fifty pounds, 385—a noted country for giving long soft hair to the animals bred in it, iii. 212—lions found to diminish in number in this country, 215—the bird of Persia is the common cock of Aristophanes, v. 161

Persian Gulph, a very dangerous wind prevails, by the natives called the sameyel—it suddenly kills those it involves in its passage, and frequently assumes a visible form, darting in a blueish vapour along the surface of the country, i. 358—the poets of Persia and Arabia have described it as under the conduct of Vengeance, who governs its terrors, and raises or depresses it, as he thinks proper, 359—the chief pearl fishery carried on there, vii. 56—that gulph choaked up in many places with coralline substances, viii. 192

Persian kings, wore their whiskers matted with gold thread, ii. 97

Persians, admire large eye-brows, joining in the middle, ii. 77—divided in two classes, tyrants and slaves, vii. 58

Perspiration, an experiment from which the learned may infer upon what foundation the doctrine of Sanctorian perspiration is built, ii. 110

Peruvians, father Acofta, and Garcilaffo de la Vega, make no doubt but that they understood the art of preserving their dead for a long space of time, ii. 273

Peter the Great, Czar of Ruffia, celebrated a marriage of dwarfs, ii. 251—the preparations for this wedding were grand, yet executed in a style of barbarous ridicule, 252

Petreolium, an injection of this bituminous oil inwardly, and an application of asphaltum without, suffice to make a mummy, ii. 287

Pettichaps, a bird of the sparrow-kind, v. 314

Phalanger, a kind of opossum—its description—has been called the rat of Surinam, iv. 248

Pharaab, (the cat of) name given to the ichneumon, iii. 376

Pharoab, (the capon of) thought to be the true ibis—a devourer of serpents, and will follow the caravans to Mecca, to feed upon the offals of animals killed on the journey, v. 385

Phasis, a river of Colchis, in Asia Minor, from the banks of which the pheasants were brought into Europe, and still retain their name, v. 184

Phatagin, an animal less than the pangolin—the extent of its tail above twice the length of its body—countries where it is to be found, iv. 124

Pheasants, at first propagated among us, brought into Europe from the banks of the Phasis, a river of Colchis, in Asia Minor, whence they still retain their name—Crcesus, king of Lydia, seated on his throne, adorned with the barbarous pomp of eastern splendour, asked Solon whether he ever beheld any thing so fine? Solon replied, that having seen the beautiful plumage of the pheasant, no other finery could astonish him, v. 184—description of this beautiful bird, 185—its flesh the greatest dainty—animals of the domestic kind, once reclaimed, still continue domestic, and persevere in the habits and appetites of willing slavery; but the pheasant, taken from its native warm retreats, still continues his attachment to native freedom; and wild among us, is an envied ornament of our parks and forests, where

he feeds upon acorns and berries, 186—in the woods the hen pheasant lays from eighteen to twenty eggs in a season; but in a domestic state seldom above ten—when wild, she hatches and leads up her brood with patience, vigilance, and courage; but when tame she never sits well; and a common hen becomes her substitute; and for leading her young to their food, she is utterly ignorant where it is found—and the young would starve if left solely to her management—it is better left at large in the woods than reduced to its pristine captivity—its fecundity, when wild, is sufficient to stock the forest, and its flesh acquires a higher flavour from its unlimited freedom—its habits, when tame, 187—no birds are shot more easily, 188—when physicians of old spoke of wholesomeness of viands, the comparison lay with the flesh of the pheasant, 186—these birds taken young into keeping, become as familiar as chickens; and when designed for breeding, they are put together in a yard, five hens to a cock—the nest in their natural state—the female refusing to hatch the eggs, a common hen supplies her place, and performs the task with perseverance and success—the young difficult to be reared, 188—with what food the young must be supplied—particularities concerning the rearing of the young ones—the method of Longolius, to increase the breed and make it more valuable—the pheasant will at last be brought to couple with a common hen, 189—many varieties of pheasants; of all others, the *golden pheasant* of China the most beautiful, 190

Pilegium, one of the highest mountains of Ethiopia, swallowed by an earthquake, i. 162

Pholas, the file-fish, places where these animals are found, vii. 65—their power of penetrating—the pillars of the temple of Serapis at Puteoli were penetrated by them—they pierce the hardest bodies with their tongue, 67—their motion slow beyond conception—have no other food but the sea-water, 68—are accounted a great delicacy, 69

Pichincha, a remarkable mountain, near Quito, in South America, i. 151

Pie, in the class of the pie-kind, few, except the pigeon, are of use to man; yet, to each other, no class of birds so ingenious, active, and well-fitted for society, v. 220—they live in pairs, and their attachments are confined to each other—they build nests in trees or bushes; the male shares in

the labour of building, and relieves his mate in the duties of incubation; and the young once excluded, both are equally active in making them ample provision—general laws prevail, and a republican form of government is established among them—they watch for the general safety of every bird of the grove, 221—they are remarkable for instinct and capacity for instruction—instances of it—fetching and carrying untaught, all this tribe are but too fond of—their passion for shining things, and such toys as some of us put a value upon—rings found in the nest of a tame magpye, 222—the few general characters in which they all agree, 223

Sea-pie breeds in this country, and resides in its marshy parts, vi. 29

Pigeons, are ruminating birds, iii. 5—those that live in a wild state by no means so fruitful as those in our pigeon-houses nearer home—the tame pigeon, and all its beautiful varieties, owe their origin to one species, the stock-dove—colours of the pigeon in a state of Nature, v. 285—the dove-house pigeon breeds every month, 286—the hatching of its eggs, 287—a full explanation of the method of feeding their young from the crop, 288—pigeons bred to a feather, means a display of art by those persons who employ themselves in rearing pigeons of different colours, ii. 248—various names of tame pigeons—attempts made to render domestic the ring-dove, but hitherto fruitless, v. 293—the turtle-dove a bird of passage—a pair put in a cage, and one dying, the other does not survive, 294—the pigeon called *ocotzimtzcan*, is one of the splendid tenants of the Mexican forests, 295—pigeons of the dove-house not so faithful as the turtle-dove—two males quarrel for the same mistress; and when the female admits the addresses of a new gallant, her old companion bears the contempt with marks of displeasure, abstains from her company, or when he approaches is sure to chastise her—instances of two males displeased with their mates, who have made an exchange, and lived in harmony with their new companions, 290—near fifteen thousand pigeons may in four years be produced from a single pair—the stock-dove seldom breeds above twice a year—have a stronger attachment to their young than those who breed so often—the pigeons called carriers used to convey letters, not trained with as much care as formerly, when

sent from a besieged city to those coming to relieve it—in an hour and a half, they perform a journey of forty miles—the only use now made of them is to be let off at Tyburn, when the cart is drawn away, v. 292

Pigmy, existence of a pigmy race of mankind founded in error or in fable, ii. 251

Pigtail, is the last of the baboons—Mr. Buffon calls it *matmon*—its description—is a native of Sumatra, not well enduring the rigours of our climate, iv. 215

Pike, the description of this fish, vi. 313—poets have called it the tyrant of the watery plain—instances of their rapacity, 339

Pilchard, little differing from the herring—make the coast of Cornwall their place of resort—the natives sometimes enclose a bay of several miles extent with nets called *saines*—how directed, some years ago, to know where to extend the nets, vi. 325—they take twelve or fifteen hundred barrels of pilchards at a draught—serve also for manure—advantages of this fishery, 327—money paid for pilchards exported has annually amounted to near fifty thousand pounds, 328

Pillau, on the Baltic, the shores near that place divided into districts for the sturgeon-fishery, and allotted to companies of fishermen, who rent some of them at three hundred pounds a year, vi. 275

Pills, of calcined shells and tobacco, used by the American Indians undertaking long journies, to palliate hunger, ii. 133

P. lori, one of the three distinctions of the musk rat—it is a native of the West-India islands, iv. 78

Pilot of the shark, name given the sucking-fish or remora, and why, vi. 242

Pince, name of a monkey of the sagoin-kind—its description, iv. 237

Pinks, hares are as particularly fond of them as of parsley and birch, iv. 7

Pintado, or the guinea hen, its description—different names given to this bird—its habits—the eggs are speckled, v. 192

Pintail, a kind of duck has the two middle feathers of the tail three inches longer than the rest, vi. 128

Pipa, the Surinam toad, an extraordinary and hideous creature—its description—the young bred and hatched on its back, vii. 108

Pipe of the shepherd, the stag seems delighted with its sound, iii. 105

Pipe-fish, cartilaginous and not thicker than a swan-quill—its description, vi. 285

Pipes, conducting water, upon what principle they depend, i. 185—why those in London are extremely apt to burst, 186

Piper-worms, and other little animals, fix their inhabitations to the oyster's sides, and live in security, vii. 48

Pit-falls, a wolf, a friar, and a woman taken in one all in the same night—the woman lost her senses, the friar his reputation, and the wolf his life, iii. 319

Pithekos, name given by the ancients to the ape properly so called, iv. 206

Pivot, the razor-shell, its motion, and habits, vii. 252, is allured by salt, vii. 53

Placentia, the burden, or that body by which the animal is supplied with nourishment, ii. 40

Plague, not well known whence it has its beginning—is propagated by infection, i. 327—some countries, even in the midst of Africa, never infected with it—others generally visited by it once a year, as Egypt—not known in Nigritia—Numidia it molests not once in a hundred years, 328—plague spread over the world in 1346, after two years travelling from the great kingdom of Cathay, north of China, to Europe—the plague desolated the city of London in 1665, 329—its contagious steams produced spots on the walls—for this last age, it has abated its violence, even in those countries where most common, and why, 330—a plague affected trees and stones, 329

Plaisne en Anjou, a village in France, particular account of a dwarf born there, ii. 255

Plaster of Paris finely powdered boils and heaves in great waves, like water, i. 181

Plantane, preferred by the ass to every other vegetable, ii. 381

Planets exceed the earth one thousand times in magnitude—at first supposed to wander in the heavens without fixed paths—perform their circuits with great exactness and strict regularity, i. 3—the lesser planets attendants upon some of the greater, 4

Plants and vegetables compared with animals, similitude—how assimilated in different climates and soils, ii. 3—will

not grow so fast in distilled as undistilled water, i. 167—do not vegetate in an exhausted receiver, 315—but thus ceasing to vegetate, keep longer sweet than when exposed to external air, 316—their juices rarefied principally by the sun, to give an escape to their imprisoned air, 338—smell of some so powerful as hardly to be endured, 219—a certain plant in Ireland so strongly affected the person who beat it in a mortar, and the physician present, that their hands and faces swelled to an enormous size, and continued tumid for some time after, 326—the sensitive, that moves at the touch, has as much perception as the fresh-water polypus, possessed of a still slower share of motion, ii. 3—the parasite fix and depend upon neighbouring trees for that support their rampant dispositions prompts them to seek, 10—the most pernicious of that race, is the caraguata, in the West Indies; it loads its supporter with a verdure not its own, takes away its nourishment, and entirely destroys it, 4—many plants propagated from the depositions of birds, v. 316—plants, submarine, coeals and other vegetables, covering the bottom of the sea, i. 288

Plate, or *Plata*, a great river in South America—its source and length, i. 216—receives above fifty rivers, 218

Platina, or white gold, the most obstinate of all substances, i. 74

Plemonectes, the flumide, description of this fish, vi. 312

Pleurs en Champagne, a town in France, buried beneath a rocky mountain, i. 158

Pliny, in his arrangements different from the present, placed the bats among birds, iv. 134

Plover, the green and grey, ate birds of passage, vi. 28—the Norfolk plover, 29 season of courtship, 31

Plumage of the king-fisher preserves its lustre longer than any other, vi. 146

Pochard, a kind of duck, vi. 128

Poetry, our ancestors excel us in the poetic arts, as they had the first rising of all the striking images of Nature, ii. 266

Point, the central point of a whirlpool is always lowest, and why, i. 206

Pointer, a kind of dog, iii. 286

Poison, the most deadly poisons are often of great use in medicine, ii. 13—Pliny, *Ælian*, and *Oppian*, have sup-

plied the weapon of the fire-flare with a poison that effects even the inanimate creation, vi. 255—but we have every reason to doubt of it, 256—fishes often live and subsist upon such substances as are poisonous to the more perfect classes of Animated Nature—that numbers of fishes inflict poisonous wounds, in the opinion of many, cannot be doubted, 342—the greatest part of the fish, on the coast of New Providence, one of the Bahama islands, are all of a poisonous nature—the many speculations and conjectures to which this poisonous quality in some fishes has given rise, 343—some crabs found poisonous, 370—the seat where the poison in venomous serpents lies, i. 194—the serpent-poison may be taken inwardly, without any sensible effects, or any prejudice to the constitution, vii. 198—an instance of it—if milk be injected into a vein, it will kill with more certain destruction than even the poison of the viper, 199

Poland, the peasant there kills a cow in autumn for his own table; he salts and hangs it up, and thus preserves it as a delicacy all the year round, iii. 9

Polar regions, description of them, i. 11—and of the inhabitants round them, ii. 213

Pole-cat, a distinct species from the ermine, iii. 358—resembles the ferret so much, that some have thought them the same animal—there are many distinctions between them—warreners assert the pole-cat will mix with the ferret, 363—Mr. Buffon denies it—description of the pole-cat—very destructive to young game, 364—seizes the flying-squirrel, iv. 36—the rabbit its favourite prey; and one pole-cat destroys a whole warren by a wound hardly perceptible—generally reside in woods or thick brakes, making holes two yards deep under ground—in winter, they rob the hen-roost and the dairy—particularly destructive among pigeons, iii. 365—and feast upon their brains, 366—fond also of honey, 358—female brings forth in summer five or six young at a time, and supplies the want of milk with the blood of such animals as she can seize—the fur is in less estimation than of inferior kinds, and why—an inhabitant of temperate climates, being afraid of cold as well as heat, 366—the species confined in Europe to a range from Poland to Italy, 367—pole-cat of America and Virginia are names for the squash and the skink—distinctions of these animals, 380

Poles, trade-winds continually blow from them towards the equator, i. 343—the winter beginning round the poles,

the same misty appearance produced in the southern climates by heat is there produced by cold—the sea smokes like an oven there, 386—limbs of the inhabitants of those regions, sometimes frozen and drop off, 387—as we approach the north pole, the size of the natives proportionably diminishes, growing less and less as we advance higher, ii. 217—the strength of the natives round the polar regions is not less amazing than their patience in hunger, ii. 218

Polynemus, description of this fish, vi. 306

Polypus very voracious—its description—uses its arms as a fisherman his net, ii. 23—is not of the vegetable tribe, but a real animal—examined with a microscope, several little speck are seen like buds, that pullulate from different parts of the body, and these soon appear to be young polypi, beginning to cast their little arms about for prey; the same food is digested, and serves for nourishment of both, 24—every polypus has a colony sprouting from its body; and these new ones, even while attached to the parent, become parents themselves, with a smaller colony also budding from them—though cut into thousands of parts, each still retains its vivacious quality, and shortly becomes a distinct and complete polypus, fit to reproduce upon cutting in pieces—it hunts for its food, and possesses a power of chusing it or retreating from danger, 25—dimensions of the sea-polypus, and of that which grows in fresh waters—the power of dissection first tried upon these animals to multiply their numbers—Mr. Trembley has the honour of the first discovery of the amazing properties and powers of this little vivacious creature, viii. 180—this class of animals divided into four different kinds by Mr. Trembley—method of conceiving a just idea of their figure, 181—manner of lengthening or contracting itself, 182—progressive motion—an appearance of an organ of sight found over the whole body—animals of this kind inclined to turn towards the light, 183---their way of living, 184---arms serve them as lime-twigs do a fowler---how it seizes upon its prey---testifies its hunger by opening its mouth---having seized the prey, opens its mouth in proportion to the size of what it would swallow, whether fish, flesh, or insects, 185---when two mouths are joined upon one common prey, the largest swallows the antagonist; but after laying in the conquerour's body for about an hour, it issues unhurt, and often in pos-

session of the prey, the original cause of contention, 186—
the cold approaching to congelation, they feel the general
torpor of Nature, and their faculties are for two or three
months suspended—such as are best supplied soonest acquire
their largest size, but they diminish also in their growth with
the same facility, if their food be lessened, 287—some pro-
pagated from eggs; some produced by buds issuing from
the body, as plants by inoculation; while all may be mul-
tiplied by cuttings to an amazing degree of minuteness, 186
—of those produced like buds from the parent stem, should
the parent swallow a red worm, it gives a tincture to all its
fluids, and the young partakes of the parental colour; but
if the latter should seize upon the same prey, the parent is
no way benefited by the capture, all the advantage thus
remains with the young, 189—several young of different
sizes are growing from its body; some just budding forth,
others acquiring perfect form, and others ready to drop from
the original stem; those young, still attached to the parent,
bud and propagate also, each holding dependence upon its
parent, 189—artificial method of propagating these animals
by cuttings, 190—Mr. Hughes describes a species of this
animal, but mistakes its nature, and calls it a sensitive flow-
ering plant, 191

Polypus-coral, the work of an infinite number of reptiles
of that kind, viii. 194—in every coralline substance are a
number of polypi, 197

Pomerania, a large part of it covered by the sea, i. 278

Pongo, name given by Battel to the ouran-outang, iv. 200

Poppies affect with drowsiness those who walk through
fields of them, or are occupied in preparing the flowers for
opium, i. 326

Porcelain, an artificial composition of earth and water,
united by heat, i. 166

Porcupine, as to quills, might be classed among the birds,
ii. 313—an enlarged hedge-hog—its description, iv. 107—
of all these brought into Europe, not one ever seen to launch
its quills, though sufficiently provoked—their manner of
defence—directs its quills pointing to the enemy—and Kol-
ben relates, the lion then will not venture an attack—feeds
on serpents and other reptiles—the porcupine and serpent
are said never to meet without a mortal engagement, 110—
how it destroys and devours the serpent—porcupine of Ca-

nada subsists on vegetables—those brought to this country for shew usually fed on bread, milk, and fruits; do not refuse meat when offered—is extremely hurtful to gardens—the Americans, who hunt it, believe it lives from twelve to fifteen years—during the time of coupling, in the month of September, the males become fierce and dangerous, and often destroy each other with their teeth—time of their gestation—the female brings forth one at a time; she suckles it about a month, and accustoms it to live like herself, upon vegetables and the bark of trees, 111—the female very fierce in the defence of her young; at other seasons, fearful, timid, and harmless—the porcupine never attempts to bite or any way injure its pursuers, manner of escaping, when hunted by a dog or a wolf—the Indians pursue it to make embroidery with its quills and eat its flesh—circumstances concerning it remaining to be known, 113—little known with precision, except what offers in a state of captivity—description of one kept in an iron cage, 113—the porcupine of America differs much from that of the ancient continent—two kinds, the couando and the urson—description of both, 114

Porcupine of the sea, described; vi. 287

Pork, unpalatable with us in summer, is the finest eating in warmer latitudes, and preferable to hog's flesh in Europe; ii. 378

Porpus, or *porpasse* a fish less than a grampüs, with the snout of a hog—its description and habits, vi. 218—a fishery for them along the western isles of Scotland, in the summer season, when they abound on that shore—live to a considerable age, though some say not above twenty-five or thirty years—sleep with the snout above water—possess; proportionably to their bulk, the manners of whales, 224—places where they seek for prey, 222—destroy the nets of fishermen on the coasts of Cornwall—manner of killing them in the Thames, 223—yield a large quantity of oil—the lean, of some not old, said to be as well tasted as veal—caviar prepared from the eggs of this fish, 224

Portuguese pretend to have tamed the zebra, and sent four from Africa to Lisbon, so far brought under as to draw the king's coach, ii. 397—its swiftness a proverb among them, ii. 396

Parts choaked up with sand by the vehemence of the wind, i. 349

Pouch, or bag, the receptacle of the civet, differs in its opening from that of the rest of the weasel kind—description of it, iii. 390—of the bustard under the tongue, capable of holding near seven quarts of water, v. 197—of the pelican, hides as many fish as will serve sixty hungry men for a meal, 53—its description, 51

Poultry, general characteristics of the poultry-kind, v. 152—they live together; and each, conscious of his strength, seldom tries a second combat, where he has been once worsted—kept in the same district, or fed in the same yard, they learn the arts of subordination, 153—the young of the kind not fed with meat put into their mouths, peck their food—the female intent in providing food for her young clutch, and scarce takes any nourishment at all—among the habits of this class of birds, is the peculiarity of dusting themselves, 156—nearly all domestic birds of this kind maintained in our yards, are of foreign extraction, 151—the courtship of this kind is short, and the congress fortuitous—the male takes no heed of his offspring—though timorous with birds of prey, he is incredibly bold among his own kind; the fight of a male of his own species produces a combat—the female takes all the labour of hatching and bringing up her young, chusing a place remote from the cock, 155

Powis Land, in Wales, for many ages famous for a swift and generous race of horses, and why, ii. 370

Pouters, a variety of the tame pigeons, v. 293

Pregnancy of all animals, in point of time, is proportioned to their size, ii. 336—the duration in the female of the elephant, still unknown, iv. 270—of some women found to continue a month beyond the usual time, ii. 47—in that state no animals, except the hare, receives the male, iv. 6

Pressure, perpendicular in rivers, always in exact proportion to the depth, i. 201

Prev, all the males of these birds a third less, and weaker than the females, v. 84. See *Birds*.

Pricket, name hunters give the buck the second year, iii.

Primas, appellation of a first-rate animal—Linnaeus bestowes it upon the female of the bat, iv. 138

Propagation of gnats, one of the strangest discoveries in Natural History, viii. 156—a new kind lately discovered in a most numerous tribe of animals, propagated by cuttings, 162—different manners of that operation in the polypi, to the astonishment of the learned of Europe, 187

Propolis, a resinous gum, with which the bees plaister the inside of their hives, viii. 72

Proportion of the human figure, little known with precision in regard to it, ii. 106—different opinions upon the subject, 107

Prospect, sketch of a delightful African prospect, on the banks of a most dreadful river, i. 220

Provider of the lion, what has given way to the jackall's being called so, ii. 322—also why the flagush is called by that name, iii. 266

Psalmodi, in France, an island in A. D. 815, now more than six miles from the shore, i. 277

Ptarmigan, sort of grouse, chiefly found in heathy mountains, and piny forests, at a distance from mankind—size and colour, v. 199

Pthiriasis, the lousy disease, frequent among the ancients—principal people who died of this disorder, vii. 274—plants and animals are infested with diseases of this kind—a vegetable louse from America over-run all the physic-garden of Leyden, 275—the leaf-louse described, 276—the males have four wings, the females never have any, 278—when they perceive the ant behind them, they kick back with their hind feet, 279—three principal and constant enemies to these insects, 280

Puffin, or coulterneb, marks that distinguish this bird, vi. 98—its residence, 100—migrations, 100—found by hundreds, cast away upon shores, lean and perished with famine, 100—lays one egg—few birds or beasts venture to attack its retreat—in what manner it defends itself against the raven, 101—the manks puffin is itself one of the most terrible invaders—instances of it—places which abound with them, 102—in what manner their young are fed—their food—formerly their flesh was allowed by the church in Lenten days—they bite extremely hard, and keep such hold

of what they seize, as not easily disengaged, 101—their noise, when taken, very disagreeable, like the efforts of a dumb person attempting to speak, 104—quantity of oil in their bodies, 105

Puget, adapted the cornea of a flea in such a position, as to see objects through it by the means of a microscope—strangeness of the representations, viii. 36

Puma, an animal decorated with the name of American lion, though, when compared, so contemptible as to be inferior to that called the American tyger, iii. 232

Pump, the air-pump, an instrument contrived to exhaust the air from a round vessel, called a receiver—in what manner it acts, i. 307—explained in an experiment upon a carp placed under such a receiver, vi. 167

Purra, a small bird of the crane-kind; with a shorter bill, and thighs bare of feathers, vi. 23

Puteoli, a city swallowed up by an earthquake, had a temple of Serapis, the pillars of which, while under water, were penetrated by the pholas, or file-fish, vii. 67

Putrefaction, a new cause of animal life—later discoveries have induced many to doubt whether animal life cannot be produced merely from thence, ii. 22

Pyramids of Egypt, one of them entirely built of a kind of free-stone, in which petrified shells are found in great abundance, i. 47

Pyrrard, his account of a kind of apes called baris, which properly instructed when young, serve as useful domestics, iv. 198

Pygmy of Tyson, is the ouran-outang, or the wild man of the wood, iv. 189

Pyrites, their composition—sulphur and iron blended and heated with air or water, will form these; and marcasites, i. 77

Quadrupeds, of all ranks of Animated Nature, they bear the nearest resemblance to man, ii. 310—are less changed by influence of climate or food, than the lower ranks of Nature—some are of so equivocal a nature, it is hard to tell whether they ought to be ranked in this class, or degraded to those below them, 312—instances of it, 313—some formed for the surface of the fields, and others made to

live upon the tops of trees, and others made to dwell under the earth, iv. 90—of all kinds, none so justly reproach the natural historian's inaccuracy, as that which bears the musk, iii. 88—the weaker races exert all efforts to avoid their invaders, ii. 323—next to human influence, the climate seems to have the strongest effects upon their nature and form, 328 both at the line and the pole, the wild are fierce and untameable, 330—one class of these entirely left to chance; no parent stands forth to protect them, and no instructor leads, or teaches them arts of subsistence; these bring forth above two hundred young at a time, 339—of all quadrupeds, the elephant the strongest and the largest, iv. 254—none that will not breed in its own native climate, except the elephant, under the dominion of man, 269—the most untractable, and for its size, the most terrible of all, the hyæna, iii. 343—the mouse most feeble, and most timid of all, except the guinea-pig, iv. 72—the largest are found in the torrid zone, iii. 28—and these are all fond of the water, 29—America inferior to us in these productions—opinion, that all in South America are a different species from those most resembling them in the old world, ii. 332—such as peculiarly belong to the new continent are without any marks of the perfection of their species, 333—the only that migrate from one part of the world to another are seals, iv. 174—their heads different from each other, are adapted to their way of living, and how, ii. 314—the large and formidable produce but one young at a time; while the mean and contemptible are prolific, 334—it has been wisely ordered so by Providence, 335—the change of colour in the hair, obtains in them all to a degree plainly observable, iii. 354—it is observable, that a thin sparing diet produces hair, 355—none fatter, none more sleek, or of glossy skin, than the mole, iv. 91—the hog in a wild state most delicate in the choice of vegetables, and rejects a greater number than any other animal, 176—the carnivorous have not milk in plenty, 366—are not fond of engaging each other, 369—those that ruminant are harmless, and easily tamed, 1—they are chiefly the cow, the sheep, and the deer-kind, 5—the chevrotin, or little Guinea-deer, the least of all cloven-footed animals, and perhaps the most beautiful—its description, 82—none can be more beautiful than the tyger, 233—those that are amphibious have motion in the lower

eye-lid alone, ii. 85—general description of amphibious quadrupedes, iv. 148—medicines procured from them, iii. 69

Quail, a bird of passage, v. 212—description of it—time of its migrations, 32, 212—opinion, that it only goes from one part of a country to another—their long journies doubtful, 213—how caught by a call—number of their eggs—fight desperately at the season of courtship, and easily taken at that time, 214

Quail-fighting, a favourite amusement among the Athenians—abstained from the flesh of this bird, supposing it fed upon white hellebore—reared numbers of them for fighting, and betted sums of money, as we do on cocks, v. 214

Quarry of Maistricht, i. 63—forty thousand people may take shelter in it—description of it, 64

Quicksilver, remarkable effects of it at the mines near Idra, related by Dr. Pope in the Philosophical Transactions, i. 79—the heaviest substance in the world, except gold—floats upon water by a particular experiment, 188—seventy-one pounds and an half found equal in bulk to an hundred pound weight of gold, 190

Quills of the porcupine; the Indians embroider with them their belts, baskets, and several other necessary pieces of furniture, iv. 112—inquiry whether the quills of the porcupine can be sent off with a shake, 113

Quito, in South America, capital city of, one of the most charming regions upon earth—this part higher than any other country in the world, i. 150—chace of the wild as in that kingdom, ii. 379

R.

Rabbit, a ruminating animal, iii. 5—rabbit and hare distinct kinds—refuse to mix with each other—instance of it—a creature covered with feathers and hair, said to be bred between a rabbit and an hen, iv. 15—have eyes of a red colour, ii. 83—few quadrupedes can overtake the rabbit in a short run, iv. 1—their fecundity greater than that of the hare—breed seven times a year, and bring eight young each time, 16—love the sunny field, and open pasture—the female suckles the young about a month—the male attends the young, leads them out, and conducts them back—have

an external retreat at a distance from the warren, as a kind of country-house, 17—female brings forth in a part of the warren, separate from the male, and digs herself a hole, more intricate, at the bottom of which is a more ample apartment—some hair she pulls from her belly makes a bed for her young, 18—the male after six weeks acknowledges them as his offspring, smooths their skin, and licks their eyes, 19

Rabbits, (tame) in a warren, continue exposed to weather, without burrowing—in two or three generations they find the necessity and convenience of an asylum, iv. 19—various colours of rabbits—the mouse-colour kinds originally from an island in the river Humber—still continuing their general colour, after a number of successive generations—account of their production, 20—surprising obedience and submission of descendants to their common parent—the descendants quarrelling, his appearance restores peace and order—sometimes he punishes them, as an example to the rest—other instances of superiority of the common parent—the rabbit generally fatter, and lives longer than the hare—its flesh less delicate, 21—native of the warmer climates—it has been imported into England from Spain—in some of the islands of the Mediterranean they multiplied in such numbers, that military aid was demanded to destroy them—love a warm climate—English counties most noted for them—delight in a sandy soil, 22—the tame larger than the wild—indulged into great plenty of moist food, as the feeders express it, are apt to grow rotten—their hair employed in England for several purposes—the skin of the male preferred, 23

Rabbit, (Syrian) remarkable for the length, gloss, and softness of the hair, iii. 212, and iv. 23—in some places curled at the end like wool, and shed once a year in large masses; and some part dragging on the ground, appears like another leg, or a longer tail, 23—no rabbits natural in America—those carried from Europe multiply in the West-India islands abundantly; on the continent there are animals resembling the European rabbits, 24

Rabbit, (Brazilian) shaped like the English, but without a tail—does not burrow like ours, and is not above twice the size of a dor-mouse, iv. 54—Guinea-pig placed by Brisson among animals of the rabbit-kind, 55

Racoon, with some the Jamaica rat—its description, iv. 333—and habits—do more injury in one night in Jamaica, than the labours of a month can repair, 334—capable of being instructed in amusing tricks; drinks by lapping as well as by sucking—its food, 334

Rains of blood, the excrements of an insect at that time raised into the air, i. 390

Rainbows, circular rainbows in the Alps, i. 145—and between the tropics and near the poles, 377—one of the three rainbows seen by Ulloa, at Quito, was real, the rest only reflections thereof—a glass globe, filled with water, will assume successively all the colours of the rainbow, 385—upon the tops of very high mountains circular rainbows are seen, and why, 386—a lunar rainbow, near the poles, appears of a pale white, striped with grey, 387—the solar rainbow in Greenland appears of a pale white, edged with a stripe of dusky yellow, 388

Rain-fowl, the name given in some parts of the country to the wood-pecker, and why, v. 249

Rams, it is no uncommon thing in the counties of Lincoln and Warwick, to give fifty guineas for a ram, iii.

44
Ranguer, the name of the ninth variety of gazelles made by Mr. Buffon, iii. 78

Rapacious, in the rapacious kinds the dam leads her young forth for months together, iv. 6

Rarefaction of the air, produced by the heat of the sunbeams in countries under the line, being flat and sandy, low and extensive, as the deserts of Africa, i.

Rats, *musk-rat*, three distinctions of that species—the *ondatra*, *desman*, and *pilori*—the *ondatra* differs from all others, having the tail flattened and carried edge-ways—in what they resemble each other, iv. 78—female of the *ondatra* has two apertures, one for urine, the other for propagation—they can creep into a hole where others, seemingly much less, cannot follow, and why—they resemble the beaver in nature and disposition—manner of life—their houses during winter are covered under a depth of eight or ten feet of snow, iv. 79—the savages of Canada think the musk-rat intolerably foetid, but deem its flesh good eating, 80—*great rat*, called also *rat of Norway*, though unknown in all northern coun-

tries—originally from the Levant, and a new comer into this country—first arrival upon the coasts of Ireland, with ships trading in provisions to Gibraltar, a single pair enough for the numerous progeny now infesting the British empire—called by Mr. Buffon the *furmalot*—its description, 65—the Norway rat, has destroyed the *black rat*, or *common rat*, as once called, 66---and being of an amphibious nature, has also destroyed the frogs in Ireland—great mischief done by the Norway rat, 67—it swims with ease, dives with celerity, and soon thins the fish-pond—the feeble animals do not escape the rapacity of the Norway rat, except the mouse, they eat and destroy each other—the large male keeps in a hole by itself, and dreaded by its own species, as a most formidable enemy—produce from fifteen to thirty at a time; and bring forth three times a year, 68—quadrupedes which have antipathies against the rat, 69—the *black rat* has propagated in America in great numbers, introduced from Europe, and are become the most noxious animals there—its description—*black water-rat*, not web-footed, as supposed by Ray—its description, 71---its food—is eat, in some countries, on fasting days, 72—the *nux vomica*, ground and mixed with meal, the most certain poison, and the least dangerous to kill rats, 70—the *German rat* described, 81—their sagacity in constructing their habitations, 82

Rat of Surinam. See *Pbalerger*.

Rat of Jamaica, a name by some given to the *racoon*, iv.

333

Rattle-snake, its description, and dimensions, vii. 208—effects of its bite, 211—the remedies against it, 212—power of charming its prey into its mouth—facts related to this purpose, 213—kind of friendship between it and the armadilla, or tatou, frequently found in the same hole, 131

Ravens, how distinguished from the *carrion-crow* and *rook*, v. 224—manners and appetites---raven found in every region of the world, 225---white ravens often shewn, and rendered so by art, 226---trained up for fowling like a hawk; taught to fetch and carry like a spaniel---to speak like a parrot, and to sing like a man, with distinctness, truth, and humour---amusing qualities, vices and defects—food in the wild state, 226---places for building nests—

number of eggs—will not permit their young to keep in the same district, but drive them off when sufficiently able to shift for themselves—three of the Western islands occupied by a pair of ravens each, that drive off all other birds with great cries and impetuosity—pick out the eyes of sheep and lambs when sick and helpless, 228—the Romans thought it ominous, and from fear paid it profound veneration—Plyny's account of one kept in the temple of Castor, and flew down into the shop of a taylor—some have lived near an hundred years—in clear weather they fly in pairs to a great height, making a deep loud noise, different from their usual croaking, 229—the horned Indian raven, 235

Ravenna, once stood by the sea-side, and is now considerably removed from it, i. 276

Ray, his method of classing animals, ii. 294

Ray, figure of the fish of this kind, and their differences, vi. 244—amazing dimensions of one speared by negroes at Guadaloupe, 247—to credit the Norway bishop, there are some above a mile over—supposed to be the largest inhabitants of the deep—chuses its retreat in such parts of the sea as have a black muddy bottom—the small approach the shores---their food---they generate in March and April, when they swim near the surface of the water, several males pursuing one female, 348—adhere so fast in coition, that the fishermen frequently draw up both together, though only one was hooked—three hundred eggs taken out of the body of a ray—in what manner the eggs drop into the womb from the ovary, or egg-bag—breeding ceases in October, and in May are in highest perfection, 249—account of the method of taking them, 250—all extremely delicate in their choice of baits; a piece of herring or haddock twelve hours out of the sea, and then used as a bait, they will not touch—best weather for taking them, 253—method used by the Italians in the Mediterranean to take this fish—they bait a line of twenty miles long, with ten or twelve thousand hooks, 254—no way of seizing the rough ray, but by the little fin at the end of the tail, 255

Rays of light moderated, and their violence dissipated by the air, i. 334

Rays of the sun, darted directly upon the surface of the water, compared to so many bars of red-hot iron, i. 370

Razor-fish, the *coryphæna* of the prickly-finned thoracic kind—its description, vi. 301

Razor-shell, the *pivet*, its motion and habits, vii. 52—is allured by salt, vii. 53

Reaumur, his chymical laboratory for hatching chickens, v. 168

Red-breast, a song-bird, seemingly mild, claims a district, whence it seldom moves, but drives away every one of the same species without pity, v. 31—its voice has the delicacy of the flute—places where found, 332—its nest, and the number of eggs, 333

Red-start, bird of the sparrow kind, v. 314

Red-wing, or *field-fare*, bird of passage—its nest and eggs, v. 323

Reed, stuck into the ground in Persia, where the earth is impregnated with inflammable vapours, continues to burn like a flambeau, i. 86

Reeve, name given to the female of the *ruff*, vi. 34

Reflection of sound, its laws not as well understood as those of light, ii. 171

Regions, the highest region in the world, i. 150—above that of storms, all is calm and serene, 253

Rein-deer, killed by eight Englishmen upon the coast of Greenland, for their subsistence, remained sweet eight months, without any salt whatever, 314—For the description of this animal see *Deer*.

Relievo, painters can never fully imitate that bold relievo, which both eyes give to the object, ii. 150

Remora, the *sucking-fish*, it sticks to the shark, and drains away its moisture; the seamen believes it attends the shark to point out prey, and apprize him of danger; for this reason it is called the *shark's-pilot*, vi. 242

Reproduction, the first discovery of the power of reproduction in animals owing to Mr. Trembley—experiments made to this purpose, viii. 172

Reptiles, grow to a prodigious size in the internal parts of South America and Africa, and why, ii. 6—many of the more humble kinds not only confined to one country, but to a plant; nay, even to a leaf, 7—entirely assimilated to the plant they feed on; assume its colour, and medicinal properties—taken from that, they instantly die—infinite

numbers of them not seen in this part of the world, and why, viii.

Resemblance to the common parent of all, the olive coloured Asiatic, and the jet black negro, claim the honour of hereditary resemblance to him—argument sufficient to prove the contrary, ii. 240—difficult to give a reason why the child should resemble the father or the mother, 248

Respiration in fishes, general method of explaining it, vi. 168—particularly in that of the whale kind, 184

Retreat of the rabbits, an external hole at a distance from the warren, as a kind of country-house, iv. 17

Rhine, a great river, proceeds from the Alps, i. 142—part of it lost in the sands, not far from Leyden, i. 224—the greatest part arrives at the ocean, i. 225

Rhinoceros, a ruminating animal, iii. 5—not afraid singly to oppose the lion, 225—next to the elephant the most powerful of animals—general out-line of it, iv. 285—the elephant defeated by it, 287—its horn sometimes found from three to three feet and an half long—this horn composed of the most solid substance, and pointed so as to inflict the most fatal wounds, 286—fabulous reports of this animal, 287—description of its tongue by L'Avocat—a rhinoceros sent from Bengal to London, not above two years old, cost near a thousand pounds for his conveyance and food—how it was fed—of a gentle disposition, permitted itself to be touched and handled by all visitors, attempting no mischief but when abused, or hungry; no method of appeasing its fury then but by giving it something to eat—when angry, it jumped against the walls of the room with great violence, 288—its age—its food—places where found, 289—in some parts of Asia, these animals are tamed, and led into the field to strike terror into the enemy, but are as dangerous to the employers—method of taking them—some found in Africa with a double horn, one above the other, 290—many medicinal virtues ascribed to this horn, when taken in powder, without any foundation, 291

Rivers, all our greatest find their source among mountains, i. 142—their production, according to De la Hire, 194—other hypothesis upon the same subject, 196—the copious fountains of the greatest most remote from the sea, 198—channels of rivers originally formed by the industry of man, according to Varenus, 200—make their own beds,

and level the bottom of their channels, 201—rivers dig and widen themselves, to a certain degree, 202—their banks appear above water, after inundations, when the adjacent valley is overflowed, and why, 202—their sinuosities and turnings more numerous as they proceed—a certain sign with the savages of North America, they are near the sea, when they find the rivers winding and often changing their direction, 203—rivers rise in the middle, and the convexity is in proportion to the rapidity of the stream, 204—when tides flow up with violence against the natural current, the greatest rapidity is then found at the sides of the river, and why --at these times, the middle waters sink in a furrow, 204—a little river received into a large, without augmenting either width or depth, and why, 207—instance of it---a river tending to enter another either perpendicularly or in an opposite direction, will be diverted by degrees from that direction, and obliged to make itself a more favourable entrance with the stream of the former---the union of two rivers into one makes a swifter flow, and why---whatever direction the ridge of the mountain has, the river takes the opposite course, 208---their branches compared to a number of roots conveying nourishment to stately trees—equally difficult to tell which the original, 217---every great river, whose source lies within the tropics, has its stated inundations, 218---those of countries least inhabited are very rocky and broken into cataracts, and why, 221---, some lose themselves in the sands, or are swallowed up by chasms in the earth, 224---at the poles necessarily small, and why, 225---the rivers of Europe more navigable and more manageable than those of Africa and of the torrid zone, 226 --all rivers in the world flowing into the sea with a continuance of their present stores, would take up at a rude computation, eight hundred years to fill it to its present height, 228

Robin-red-breast, a slender-billed bird of the sparrow-kind, living upon insects, v. 314

Rock, great bird, described by Arabian writers, and exaggerated by fable, supposed to be but a species of the condor, between the eagle and vulture, v. 105

Rocks and precipices, those of St. Kilda are more than three quarters of a mile perpendicularly—description of a very bold coast, vi. 78

Roe-buck, the smallest of the deer-kind in our climate—its description, iii. 131---differs from the fallow-deer, from the stag, and from all the goat-kind, 132—faces the stag, and often comes off victorious---these bucks live in separate families; the sire, dam, and young associate, and admit no stranger into their community, 133---never leaves its mate—rutting season continues but fifteen days, from the end of October to the middle of November---female goes with young five months and a half, 134---produces two at a time, and three rarely---her tenderness in protecting them very extraordinary, 135—names given by hunters to the different kinds and ages of it, 136—time of shedding its horns, 137---its life seldom longer than twelve or fifteen years; and tame, not above six or seven---is of a delicate constitution---easily subdued, but never thoroughly tamed—its cry neither so loud nor so frequent as the stag's—hunters easily imitate the call of the young to the dam, and thus allure her to destruction, 138—this animal contented to slake its thirst with the dew on the grass and leaves of trees—prefers tender branches and buds of trees to corn and other vegetables—we have but two known varieties---the flesh of those between one and two years old the greatest delicacy known---more common in America than in Europe—inhabitants of Louisiana live upon its flesh, which tastes like mutton when well fatted---the breed extremely numerous, and the varieties in proportion, 139---found also in Brasil, where called *cuguacu-apara*; and in China---its describers confound it with the musk-goat, though of a different nature, 140

Roger de Belegme, the first recorded for attempts towards mending our native breed of horses, ii. 370

Roger of Sicily, at his return from the Holy Land, brought workmen for the silk manufactory from Asia Minor, and settled them in Sicily and Calabria, in the beginning of the twelfth century, viii. 50

Roller, a beautifully bird of the pie-kind; its description, v. 242

Romans cut down all the woods and forests in Britain, and why, i. 286—in battle, opened their ranks to admit the elephant, and separating it from assistance compelled its conductors to calm its fury, and submit, iv. 277—the vanity of their boasts best shewn by the parrot-kind, in an hundred

species now known, not one of those birds naturally breeds in any of the countries that acknowledged the Roman power, v. 283—a Roman emperor had fifteen hundred flamingo's tongues served up in a single dish at a feast, vi. 15—a Roman senator used to throw into his ponds such of his slaves as offended him, to feed the lampreys, 270—infamous for a Roman to appear in a dress, in which silk entered into the composition, viii. 49

Rombald, a holy temperate man, said to have lived an hundred and twenty years, cheerful by strong hopes, and healthy by moderate labour, ii. 132

Rooks, of the pie-kind; not carnivorous, v. 330—places where they build their nests—their plan of policy, 231—young couples making nests too near an old pair, a battle ensues, and the old become victorious—fatigues of the young in making nests, 233—the female beginning to lay all hostilities cease, and she is suffered to hatch her brood without molestation—a foreign rook attempting to join society with them, would have the grove in arms against him, and be expelled without mercy, 234—their chief food, 235

Roses, otter of roses, a modern delicate perfume, iii. 394

Rouffette, the great bat of Madagascar, a formidable creature, described, iv. 141—drinks the juice of the palm-tree, 142

Royston-crow, a bird of passage, described, v. 230

Rubeth, the land-toad, the only one of the kind that has the property of sucking cancerous breasts, vii. 105

Ruff, small bird of the crane-kind, vi. 33—manner of taking it, 34—their flesh in high estimation, 35

Ruminant animals most harmless and easily tamed—generally go in herds for mutual security—live entirely upon vegetables, iii. 1—the meanest of them unite in each other's defence—are more indolent and less artful than the carnivorous kinds, and why—Nature has enlarged the capacity of their intestines for a greater supply of food, iii. 2—their bowels considered as an elaboratory with vessels in it, 3—made their intestines strong, fleshy, and well covered with fat, 4—and furnished them with four strong and muscular stomachs, 3—some that are not furnished with four stomachs—ruminant quadrupedes, birds, fishes, insects, 5—men known to ruminate; instance in a young man at Bristol,

5—those of the cow-kind hold the first rank, 8—all of this class internally much alike, 36—have not the upper fore-teeth, 44—the stag performs this with more difficulty than the cow or sheep, 106

Runner, the *corrira*, bird of the crane-kind, its description, vi. 21

Runts, a variety of tame pigeons produced by cross-coupling, v. 293

Russian foldiers and condemned criminals sent into Siberia to kill fables, both taxed at a certain number of skins yearly—a colonel, during seven years stay, gains about four thousand crowns for his share, iii. 375

Rust, copper and iron quickly covered and corroded with it—gold contracts no rust, and why—except in the elaboratories where salt is much used, i. 313

Rut, time when the stags feel the desire of copulating, iii. 101—their neck is then swollen—other effects which it causes in stags, 102—their voice at that time terrible, 106

S.

Sable, its description, from Mr. Jonelin, the first accurate observer of this animal, iii. 373—sables leap with ease from tree to tree, and are afraid of the sun—different colours of their fur, 374—hunting the sable chiefly the lot of foldiers and condemned criminals—how directed to shoot them, 375

Sabre, the trachepterus, description of this spinous fish, vi. 303

Sacre, bird of the generous breed of hawks, the legs are of a blueish colour, and serve to distinguish it, v. 122

Sago tree, eat by the elephant to the stump, iv. 259

Sa, the bewailer, a monkey of the new continent, 236

Sail, a stag hard hunted, taking to the water, is said to go sail, iii. 114

Saines, name of the nets used in the pilchard fishery, on the coast of Cornwall, vi. 326

Sajou, third sort of the sapajou, a monkey of the new continent, iv. 236

Saki, the cagui, the largest monkey of the sago kind—its description, iv. 237

gal ammoniac, made of the urine of camels, iv. 311

Salamander, there is no such animal existing as that described by the ancients—the modern salamander a lizard—its conformation and habits, vii. 139—reports concerning their venom, 140—idle notion of its being incombustible in fire, 142—internal conformation of the lizard, 143—manner of its bringing forth young alive, all amphibious, 145—sustain want of food surprisingly, 146

Saliva, in the lama, or American camel, supplied by Nature in such abundance, that it spits on all occasions, and seems the only offensive weapon of this harmless creature—the Indians think it of so acrimonious a nature, as to burn the skin, or cause dangerous eruptions, iv. 315

Salmon, said to be a ruminating fish, iii. 5—a soft-finned abdominal fish, vi. 307—the young continue in the egg from the beginning of December to the beginning of April, 178

Salt water, opinions about the saltiness of the sea, particularly that of Boyle, i. 234—method of finding out the age of the world by the saltiness of the ocean, 235—saltiness found to prevail in every part of the ocean, as much at the surface as at the bottom—also found in some lakes, 236—considered as a principal cause in preserving the sea from putrefaction—it is confirmed by experiments, 239—advantages derived from the saltiness of the sea, 241—various attempts to make it fresh, 237—its weight, 241—See *Sea water*.

Salt, Bay-salt, brought from the Bay of Biscay, a strong kind, made by evaporation in the sun, i. 241—fishes do not imbibe any of the saltiness of the sea-water, vi. 315—destroys snails, vii. 25—allures the pivot, or razor-shell, 53—salt sprinkled upon the water-lizard, the whole body emits a visciduous liquor, and it dies in three minutes, in great agonies, 146—volatile caustic salt obtained in great quantity from the cantharides fly, viii. 143

Samayel, a wind along the coasts of the Persian Gulph, which assumes a visible form, and instantly kills all those involved in its passage, i. 358

Samiri, the aurora, the smallest and most beautiful monkey of the sapajou kind—its description—a very tender delicate animal, and held in high price, iv. 336

Samoeid Tartars, description of that people, ii. 213

Sanctorian statical experiments upon a weak foundation, ii. 111

Sand, rolling in waves like a troubled sea, and overwhelming all with inevitable destruction, i. 13—fine vitrifiable, found in a well dug at Marly, 57—so fine, and driven with such violence, as to penetrate into chests, be they shut never so closely, 357—tract of a country, lying along the sea-side in Lower Brittany, inhabited before the year 1666, now lies desert, being covered with sand to the height of twenty feet, 364

Sanderling, small bird of the crane-kind, vi. 23

Sandpiper, small bird of the crane-kind, vi. 23

Santorin, an earthquake happened in it in 1707, i. 126—the new volcano near it, i. 127

Sapajou, name given to the monkeys of the new continent, that have muscular holding tails—five sorts of them, iv. 235

Savages more difficult in point of dress than the fashionable or tawdry European, ii. 98—instance of it, 97—perform a journey of twelve hundred leagues in less than six weeks, 115—oblige their women to a life of continual labour—is surprised a European walks forward for his amusement and return back again, 121—the boast of corporal force now resigned to savage nations, and why, 119—are highly delighted with the smell of asafetida, 181—their customs in every country almost the same, 230—those of Africa the most brutal—they and those of America, suppose monkeys to be men, idle, slothful, rational beings, capable of speech and conversation, but obstinately dumb for fear of being compelled to labour, 231

Sauce made with the blood and marrow of the reindeer, and kept for use in small casks by the Laplanders, iii. 167

Savoyards, the only chimney-sweepers of Paris carry about for shew the marmotte bred in their native country, iv. 39

Scallop, in its shell, moves forward upon land, and swims upon the surface of the water, by contrivance in a singular manner, vii. 51

Scar, a child distinctly marked similar to one the father had from a wound received in battle, ii. 238

Scarus, if we believe Ovid; is like the salmon, a ruminating fish, iii. 6

Scarp-duck, a variety of the duck-kind, vi. 130

Scent, the negroes of Guinea have an insupportable scent, ii. 226

Schottus assures us, he saw an instance of fishes being allured by music, ii. 168

Sciæna, a spinous fish—description of this fish, vi. 308

Scolecendra, the centipes, an hideous angry worm, described, vii. 302

Scomber, the mackarel, a prickly-finned thoracic fish—its description, vi. 301

Scorpei, bird of the crane-kind, chiefly found in Italy, vi. 20—See *Avocetta*.

Scorpaena, or father-lasher of the prickly-finned thoracic kind—description of this fish, vi. 308

Scorpion, four principal parts distinguishable in this animal, vii. 292—the reservoir where its poison is kept, 293—effects of its sting upon a dog, in an experiment made by M. Maupertuis, 294—experiments made upon other dogs, 295—instances of its irascible nature and malignity, 297—when driven to extremity, destroys itself, 298—instance of it—the male smaller than the female, 299—their chief food, 300—how the common scorpion produces its young, 299—captivity makes it destroy its young—a scorpion of America produced from the egg, 301

Water-scorpion, an insect with wings, described, vii. 359 its habits, 360

Scoter, an European duck, vi. 127

Scotland has land in it at one time covered with water, at another free, i. 279—not infested with wolves, iii. 319

Scotchman, in the Tower for felony, took not the least sustenance during six weeks, the records of that fortress mentioning his being exactly watched all that time, ii. 133

Sea was open to all till the time of the emperor Justinian, i. 232—sensibly retired in many parts of the coasts of France, England, Holland, Germany, and Prussia, 275—Norwegian sea has formed several little islands from the main land, and still daily advances upon the continent, 278—its colour not from any thing floating in it, but from the

different reflections of the rays of light—a proof of it—though its surface be deformed by tempests, it is usually calm and temperate below, 292—the sea grows colder in proportion as divers descend, 292—smokes like an oven near the poles, when the winter begins, 386—no fish imbibe any of the sea-saltnefs with food or in respiration—why some species live only there, and expire when brought into fresh water, accounted for, vi. 315

Red sea choked up with coralline substances, i. 288 and viii. 192—along some shores, and at the mouths of several rivers, the bottom has the appearance of a forest of trees, millions of plants standing so thick as to obstruct navigation, 191

Sea-eggs, name given to the multivalve shell-fish, of the echini, or urchins, which move, vii. 61

Sea-nettles, name given by some to the star-fish, viii. 175

Sea-water about a forty-fifth part heavier than fresh water, i. 241—is heavier, and consequently saltier the nearer we approach the line, 242—various methods proposed to render it fresh for the use of seamen in long voyages, 237—See *Salt-water*.

Sea-worm may be multiplied by being cut to pieces, ii. 23—See *Polypus*.

Seal resembles a quadrupede in some respects, and a fish others, ii. 313 and iv. 168—its description—the varieties innumerable, 168—the brain largest of any animal—its tongue differs from other quadrupedes, 170—the *foramen ovale* in its heart never closing, fits it for continuing under water, though not so long as fishes, 171—the water its habitation, and any fish its food—makes little use of its legs, 172—seldom at a distance from the shore—found in the North and Icy Seas, and on those shores in flocks, basking on the rocks, and suckling their young—alarmed, they plunge altogether into the water—in thunder and torrents they sport along the shore, as delighted with universal disorder, 173—gregarious and migrant, direct their course to northern coasts, and seas free of ice, in two departures, observing time and track, 174—how and by what passages they return unknown—they go out fat, and return lean—females in our climate bring forth in winter—where they

rear their young—how they suckle them—she has four teats near the navel, in fifteen days she brings the young to the water, to swim and get food—no litter exceeds four—the young know the mother's voice among the bleatings of the old—assist each other in danger, and are obedient to her call, 175—hunt and herd together, and have a variety of tones like dogs and cats, to pursue prey, or warn of danger—feeling natural desires, they fight desperately, and the victorious male keeps all to himself—two never fall upon one, each has its antagonist—neither length of time in pregnancy, nor duration of these animals lives yet known, 176—two taken young, after ten years had the marks of age—expert at catching fish—destroy herrings by thousands swift in deep waters, they dive with rapidity, 177—attacked with stones, they bite at what is thrown, and to the last gasp annoy the enemy—time to surprise them—how the Europeans and Greenlanders destroy them, 178—in our climate they are wary, and suffer no approach—never sleep without moving, and seldom more than a minute, 179—taken for the skin, and oil the fat yields—uses of the skin when dressed—the flesh formerly at the tables of the great—an instance of it, 180—the sea-lion, in Anson's Voyages, the largest of the seal family, 181

Sebald Wert, a traveller, confirms the existence of giants in St. Julian's Bay, forty-nine degrees south of the line, ii. 261

Seeds, some thought to thrive better for maceration in the stomach of birds, before they be voided on the ground, v. 316

Senegal, a river in Africa, its course—is navigable for more than three hundred leagues, i. 212—receives more than twenty rivers, 217—the natives consider forty years as a very advanced time of life, and generally die of old age at fifty, 321

Sensations, their illusion at first when man is newly brought into existence, described by Mr. Buffon, ii. 187—fish fall behind terrestrial animals in their sensations, vi. 157

Senses, acting at some distance, proportionably more capable of making combinations; and consequently more improveable, ii. 178—of all senses man is most inferior to other animals in that of smelling—and it seems not to offend them,

179—the grossest, and most useful of all, is that of feeling,
185

Sensitive plant, has as much perception as the fresh water
polypus, ii. 3

Septs, improper name of the Chalcidian lizard, the last
division of that kind—description of this animal, vii. 157—
its bite very venomous, vii. 215

Seraglio, to be able to furnish one the only tendency of
the ambition of an Asiatic, ii. 72

Serpents, the sea about the islands of Azores replenished
with them for want of motion, i. 239—to believe all said of
the sea-serpent, is credulity; to refuse assent to its existence,
is presumption, vi. 190—the various hissings at the close of
the evening, make a louder symphony in Africa than birds
in European groves in a morning, iii. 321—histories of anti-
quity exhibit a nation sinking under the ravages of a serpent,
vii. 162—Regulus leading his army along the banks of the
river Bagrada, in Africa, an enormous serpent disputed the
passage, its skin was an hundred and twenty feet long,
vii. 163—marks distinguishing them from the rest of ani-
mals—their conformation, vii. 165—and progressive mo-
tion, 171—the natural food of the ichneumon, iii. 379—
the only animal in the forest that opposes the monkey—sur-
prising them sleeping, swallows them whole, before they
have time for defence—monkeys inhabit the tops of trees,
and serpents cling to branches towards the bottom; thus
near each other, as enemies in the same field of battle—this
vicinity thought to argue a friendship—monkeys provoked
the serpents by jumping over them, iv. 220—encounter of
a great serpent with a buffalo—entwines and devours the
buffalo, vii. 174—long serpent of Congo, 176—some bring
their young alive, some bring forth eggs, 184—some veno-
mous, and some inoffensive, 186—animals which destroy
them, 188—boasted pretensions of charming serpents, 189
have docility—Egyptians paid adoration to a serpent; and
inhabitants of the western coast of Africa retain the same
veneration, 190—all amphibious, 182—their motion, swim-
ming in liquids, 183—excrements of some kept as a plea-
sing perfume at Calcutta and Cranganon—the Esculapian
serpent, 184—little serpent at the Cape of Good Hope, and
north of the river Senegal, 172—sea-serpent, the elops de-

scribed, vi. 304—the prince of serpents a native of Japan; the greatest favourite of savages, and has not its equal for beauty, vii. 224—seat of poison in venomous serpents; instrument by which the wound is made, 193—those destitute of fangs are harmless, 194—various appearances the venom produce, 197—may be taken inwardly without sensible effects or prejudice to the constitution, 198—instance of it, 199—another of the force of serpents' poison, from Ray, 200—no animals bear abstinence so long as they, 178—their powers of digestion but feeble, 179—their principal food birds, moles, toads, lizards, 202—little serpents live for several years in glasses, never eat at all, nor stain the glass with excrements, 179

Serval, a native of Malabar, resembling the panther in its spots, iii. 258

Setter, a dog of the generous kind, iii. 286

Sewern, lamprey of this river the most delicate of all fish, vi. 66

Shagreen, made of the skin of the wild ass, ii. 377—the skin of the shark, by great labour, polished into the substance called shagreen, vi. 243

Shammoy, a kind of goat, in the mountains of Dauphine, Piedmont, Savoy, Switzerland, and Germany, iii. 63—its description, 65—keep in flocks from four to fourscore, and an hundred—time of coupling—live twenty or thirty years—their flesh good to eat; the suet from ten or twelve pounds, 63—this animal has a feeble bleat, to call its young; in cases of danger, its hissing noise is heard at a great distance—by smell, discovers a man at half a league, 64—feeds upon the best herbage, and delicate parts of plants, and aromatic herbs—admired for the beauty of its eyes, 65—not found in summer, except in caverns of rocks, amidst fragments of ice, or under shades of spreading trees, 66—during winter, it sleeps in the thicker forests, and feeds upon shrubs and buds of pine-trees, and scratches up the snow for herbage, 67—manner of hunting it—dogs useless in the chase, 68—skin of the shammoy when tanned, liked for softness and warmth; the leather now called shammoy, made from the tame goat, sheep, and deer, 68—medicinal virtues said to reside in the blood, fat, gall, and the concretion found in the stomach, and called the *German bezoar*, 69.

Shank, the *red*, and the *green shank*, varieties of the crane kind—their dimensions, vi. 23

Shark, description of the great white shark—the mouth and throat enormously wide; capable of swallowing a man, vi. 234—great number of its teeth, 235—no fish swims so fast, 153—outstrips the swiftest ships—obliged to turn on one side (not on the back) to seize their prey, 236—instances of frightful rapacity in this fish, 237—its enmity to man; along the coast of Africa many negroes are seized and devoured by them yearly—loves the black men's flesh better than the white, 237—usual method of sailors to take them—no animal harder to kill; when cut in pieces, the muscles preserve motion, and vibrate for some minutes separated from the body, 239—how killed by the African negroes, 241—the remora, or sucking-fish sticks to it; for what purpose—for resemblance to the whale ranked amongst cetaceous fishes—brings forth living young—Rondeletius says, the female of the blue shark lets her brood, when in danger, swim down her throat, and shelter in her belly, 241—in Mr. Pennant's opinion, the female is larger than the male, through all this tribe, 243

Shoat-fish, the stirrus of the prickly-finned abdominal kind, its description, vi. 304

Sheep, in the domestic state, stupid, most defenceless, and inoffensive—made so by human art alone—its description, iii. 38—those living upon fertile pasture, growing fat, become feeble, 40—those without horns, more dull and heavy than the rest—those with longest and finest fleeces most subject to disorders—the goat, resembling them in many other respects, much their superior, 41—they propagate together, as of one family, 35—sheep follow the sound of the shepherd's pipe, 42—in course of time impoverish the pasture, 10—they eat three hundred and eighty-seven plants, and reject an hundred and forty-one, 176—the author saw one that would eat flesh, ii. 327—have eight teeth in the lower jaw—are shed and replaced at different periods—some breeds in England never change teeth, and are supposed old a year or two before the rest, iii. 44—bring forth one or two at a time, sometimes three or four; the third lamb supposed the best—bear their young five months, 45—their eyes are of a water colour, ii. 83—and the intestines thirty

times the length of their body, iii. 210---do not appear from old writers to have been bred in early times in Britain, 43—to spare the stock Queen Elizabeth enjoined her subjects should fast from flesh on Fridays and Saturdays, ii. 131—no country produces such sheep as England; larger fleeces, or better for clothing---sheep without horns the best sort, and why, 44---profitable care taken of the animal produces favourable alterations in the fleeces here and in Syria, ii. 329—the sheep in its noblest state is in the African desert, or the extensive plains of Siberia, iii. 45---the *mousson*, or sheep in the savage state, a bold fleet creature, able to escape from larger animals, or to oppose smaller kinds with the arms received from Nature, 39---the woolly sheep is only in Europe, and the temperate provinces of Asia—transported into warmer countries, as Florida or Guinea, loses the wool and fertility, and the flesh its flavour—subsists in cold countries, but not a natural inhabitant of them, 46---the *Iceland sheep* have four, and sometimes eight horns, on different parts of the forehead—its wool inferior to that of the common sheep---with broad tails, common in Tartary, Arabia, Persia, Barbary, Syria, and Egypt; the tail often weighs from twenty to thirty pounds, and sometimes supported by a small board, upon wheels, 47—those called *strepsicheros*, a native of the Archipelago—Guinea sheep described, 48---in Syria and Persia, remarkable for fine gloss, length, and softness of hair, ii. 12---distinguished from deer; these annually shedding the horns, while the permanence in the former, draws an exact line between their kinds, 36

Sheldrake, a variety of the pond-duck, supposed a native of England, vi. 128

Shells, (fossil) found in all places near to and distant from the sea, upon the surface of the earth, on the tops of mountains, or at different depths digging for marble, chalk, or other terrestrial matters, so compact as to preserve these shells from decay, i. 17—long considered as mere productions of the earth never inhabited by fish—some have not their fellows in the ocean, i. 41, vii. 15—but all have the properties of animal, not of mineral nature; their weight the same with those upon shore, answer all chemical trials as sea shells do—and have the same effects in medicinal uses, i. 41—various kinds found at an hundred miles from the sea at Touraine in France—a continued bed of oyster-shells

found through the whole circumference of five or six acres of ground near Reading, in Berkshire—shells found petrified in all the Alpine rocks, in the Pyrenees, on the hills of France, England, and Flanders; 42—a floor, or pavement, of petrified shells found in Kent, near the Medway, 44—shells always remaining in the deep, 46—easier to believe fossil shells bred in fresh water, than that the sea for a time covered the tops of high mountains, 50—petrified shells found in one of the pyramids of Egypt, 47—great variety of fossil, or extraneous shells, vii. 15—different states of preservation—every shell the spoil of some animal—no matter how parted from the sea, 16—Swammerdam's attention to testaceous animals almost beyond credibility, 17—volumes upon the subject of shells, contribute little to the history of shell-fish, 2—methods of conveying a just idea of the formation of sea-shells and garden-shells, 3—usual way of accounting for different colouring in shells, 6—hint about the operation of Nature in colouring shells—they assume every colour but blue, 7—the animal not solely the agent in giving beauty and colouring to it, 8—*stairs-shell*, or *admiral-shell*, not more precious for their scarceness, than pearls for their beauty, 10—collections of shells have their use, 11—naturally classed by Aristotle—places where shells are found, 12—and substances of which they are composed—supposition that all earths fermenting with vinegar, are composed of shells, crumbled down to one mass—what shells most valuable, 13 sea-shells exceeds land or fossil shells in beauty—some living land shells not inferior in beauty to fresh-water shells, 14

Shells of the sea, scarce one met with entire and found to the end of its convolutions, and why, vii. 34—of all sea-shells, that of the nautilus, the thinnest and most easily pierced, vii. 35—all bivalved shells, furnish pearls, and their infides resemble and afford that substance called mother-of-pearl, 53—some pierced by worms argue them food for such animals, 16

Shells, animal, of the armadilla or tatou, one of the most striking curiosities in natural history, iv. 126—turtle-shells of an amazing magnitude, vi. 393

Shaque Ismael, in his time the Arabians first began the management of horses, ii. 349

Shetland isles, amazing quantity of herrings appearing off these islands, vi. 323

Shores, of all those in the world, not one so high as that to the west of St. Kilda, six hundred fathom perpendicular above the surface of the sea, i. 272—some on which the sea has made temporary depredations, 279

Short-heads, name given by sailors to the young of the whale, whilst at the breast, vi. 196

Showeller, species of the crane kind—its food—inhabitants of the Cape of Good Hope respect it as the ancient Egyptians did their bird ibis, vi. 8—its nest and eggs, 9

Shoulders, high in sickly persons—people dying, are seen with their shoulders drawn up in a surprising manner, ii. 103—women with child also, usually seen high-shouldered, 104—shoulders, in women, narrower than in men, 107

Showers, dreadful showers of hail in 1510—its description, i. 376—of stones, fishes, and ivy-berries, raised into the air by tempests in one country, and falling at a distance like rain, to astonish another, 390

Shrewsbury, Roger de Belegme, created earl of Shrewsbury by William the Conquerour, first upon record to have attempted mending our native breed of horses, ii. 370

Siacus, called by Mr. Buffon the caracal, of the lynx-kind, a native of the East Indies, resembles the ounce in size, iii. 258—met with only in warm tropical climates—used, in the same manner as the ounce, for hunting, 265—called also the lion's provider; and said when it calls him to pursue prey, its voice resembles that of a man calling another—one sent over from the East Indies, could not endure the change of Climate, 266—has killed a large dog in single combat; yet remarkable for cowardice, 267—how it makes the gazelle and antelope easy preys to the hunters, iii. 266

Siberia, the animal between dog and fox, called isatis, found in this country, and seldom in milder, climates, iii. 340—the sable resembling the martin found in this country; soldiers and exiled criminals hunt it, and furnish annually numbers of its skins, 375—enormous tusks found lodged in the sandy banks of the rivers in this waste country, iv. 282

Sicily and Calabria taught the other kingdoms of Europe the silk-manufacture, viii. 50

Sighs, in what manner produced—when invigorated produce sobbing, ii. 92

Sight, of old men indistinct for bodies close to them, but more precise for objects at a distance from them, and why, ii. 158—of birds exceeds that of other animals, and excels

in strength and precision—a kite, from an imperceptible height in the clouds, sees its prey, and darts on it with unerring aim, v. 10—of birds that prey by day, astonishingly quick; and in such as ravage by night, so fitted as to discern objects in darkness with precision, 80

Signs of death, uncertainty of them ought to make every one cautious of giving up a friend as dead, and exposing him to real death, or a premature interment, ii. 208

Silks, brought to Jamaica, and there exposed to the air, rot while they preserve their colour, but kept from air retain their strength and gloss, i. 314—anciently so scarce in Rome as to be sold for their weight in gold; and considered such a luxurious refinement in dress, that infamy was attached to wearing stuffs in which it made but half the composition, viii. 49

Silk-worms, its real history unknown among the Romans to the time of Justinian; and supposed only brought into Europe in the twelfth century, viii. 50—two methods of breeding them, 51—Pausanias's description of this worm, 50—changes of its skin in three weeks or a month, 55—gummy fluid forming the threads, 56—preparations made before spinning the web, 57—the cone or ball of silk described, 58—efforts to burst the cone—free from confinement, it neither flies nor eats; the male seeks the female, impregnates her in an uninterrupted union of four days, then dies upon separation, she survives till she has laid her eggs, which are hatched into worms the ensuing spring—few of these animals suffered to come to a state of maturity, and why, 59—the most serviceable of all such creatures, 4

Manufactures of silk, established in Europe, in the beginning of the twelfth century, by Roger of Sicily, viii. 50

Silurus, the sheat-fish of the prickly-finned abdominal kind, its description, vi. 306

Simeon, said to have lived an hundred and twelve years, ii. 132

Sinews of the rein-deer, the strongest kind of sewing thread, iii. 167

Single, name of the tail of the stag, iii. 113

Siskin, singing bird of the sparrow-kind, with a thick and short bill, feeding on grain and fruit, v. 315—time of its migration, 317

Size of men varies considerably, ii. 108—the human body often differs from itself, 110—the same person taller

when he rises in the morning, than going to bed at night; sometimes the difference is an inch; this first perceived in England by a recruiting officer—in what manner, 108—the cause of it, 109—men are tall from five feet eight inches to six feet high—middle size from five feet five to five feet eight, 108—Maximin, the emperour, above nine feet in height, ii. 118—approaching towards the north pole, the natives diminish proportionably, growing less and less in higher latitudes, 217—cause of their difference—an ox, on the fertile plains of India, grows four times as large as the lesser animal of the same kind in the Alps, 237—of men of all ages nearly the same as at present—many corroborating proof of this, 265

Skates, Laplanders make use of them upon the snow, and how, ii. 215

Skeleton of the bat in some measure resembles that of man, iv. 135—some human lately discovered of enormous size, five or six feet beneath the surface, on the banks of the Ohio, not far from the river Miume, in America, 282

Skin, the only part of the body that age does not harden—whence its wrinkles proceed, ii. 197—of the rein-deer, a more valuable part of the animal than any other—uses of it, iii. 166—of the tiger, much valued all over the East, 243—of the black fox most esteemed, a single skin selling for forty or fifty crowns—the hair is so disposed, that it is impossible to tell which way the grain lies, 333—most valuable part of the martin's skin—twelve thousand of these annually imported into England from Hudson's bay, and thirty thousand from Canada—most worth when taken in the beginning of winter, 372—of all, that of the sable most coveted, and held in highest price—a single skin four inches broad, is often sold for ten or fifteen pounds—the fur surpassing all other in having no grain; whatever way rubbed, is equally smooth and unpeeling, 373—a certain number of these furnished every year by condemned exiles, and Russian soldiers, sent into Siberia to kill the animal, 375—of the ondatra also very valuable, iv. 80—of the mole, Agricola saw the finest and most beautiful hats that could be imagined, made of their skins, 98—of the hedge-hog, converted to no use, except to muzzle calves, from sucking, 105—of the elephant, not covered with hair—that part covering the head resembles the bark of an old tree more than the skin

of an animal, 265—of the rhinoceros, so thick as to turn the edge of a scymetar, and resist a musquet-ball, 286—is nasal, rough, knotty, and lying upon the body in folds, after a very peculiar manner, 285—of the ostrich, what use the Arabians make of it, v. 61—of the great Greenland whale, marbled white and yellow, vi. 192—of the civet, so strongly scented, a person shut up with one in a close room cannot support the perfume, iii. 392

Skink, an animal called one of the pole-cats of America, iii. 380—the author thinks it Catesby's Virginia pole-cat—its description, 381

Skull-fish, name of the whale above two years old, vi. 197

Slatberg, in Ireland (in the lands of) there stood a declivity, and the earth of it was found sliding down the hill upon the subjacent plain, i. 160

Sleep, with some lower animals, takes up the greatest part of their lives—man the only creature requiring sleep from double motives, for the refreshment of the mental, and of the bodily frame, ii. 134—want of it produces madness, 135—procured to man with more difficulty than to other animals—in what manner sleep fetters us for hours together, according to Rohault, 136—care required to regulate its quantity, and why, 137—bodily labour demands a less quantity of it than mental—the famous Philip Barrettier slept twelve hours in the twenty-four, 138—sleep to some an agreeable period of existence—questions treated in the schools to this purpose, 139—numberless instances of persons who, asleep, performed many ordinary duties of their calling; and, with ridiculous industry, completed by night, what they failed doing by day—remarkable instance related in the German Ephemerides, 140—ridiculous history of Arlotto, a friar, with a narrative of the actions of his life, when asleep, 142

Sloth, two different kinds of that animal, the air and the unan, iv. 343—described, 344—both seem the meanest and most ill-formed of all animals that chew the cud—their food—formed by nature to climb—they get up a tree with pain, but utterly unable to descend—drop from the branches to the ground, 345—move with imperceptible slowness, baiting by the way, 346—strip a tree of its verdure in less than a fortnight, afterwards devour the bark, and in a short time kill what might prove their support, 345—every step taken, sends forth a plaintive melancholy cry, which, from some

resemblance to the human voice, excites a displeasing pity, 346—like birds, have but one vent for propagation, excrement, and urine, 347—they continue to live some time after their nobler parts are wounded, or taken away—their note, according to Kircher, an ascending and descending hexacord, uttered only by night—their look piteous, to move compassion; accompanied with tears, that dissuade injuring so wretched a being—one fastened by its feet to a pole, suspended across two beams, remained forty days without meat, drink, or sleep, 347—an amazing instance of strength in the feet instanced, 348

Slo, term for the print of the hoof of the stag, iii. 113—to draw on the slot, a phrase among hunters, iii. 114

Slow, name given by some to the blind-worm, vii. 222

Smell, no substance now known in the world has a stronger, and more permanent smell than musk, iii. 89—strong offensive smell of foxes often the cause of their death, 324—of the weasel-kind, kept tame about the houses of the planters in America, not very offensive, 383—of the genet, not endured by mice and rats, 388—the musky not properly a characteristic mark of any kind of animal, 32

Smelling, the sense in which man is most inferior to other animals—it never offends them—stronger in nations abstaining from animal food than in Europeans, ii. 179—Bramins of India have a power of smelling, equal to what is in other creatures—can smell water they drink, to us quite inodorous—negroes of the Antilles by smell distinguish the footsteps of a Frenchman from those of a negroe—in a state of nature useful, not in our situation—gives often false intelligence, 180—natives of different countries, or different natives of the same, differ widely in that sense—instances of it, 181—mixtures of bodies void of odour produce powerful smells—mixtures of bodies separately disagreeable, give pleasant aromatic smells—a slight cold blunts all smelling—incurable aversions to smells formerly agreeable, retained from disorders—smallest changes in man make great alterations in this sense—antipathies to animals, whose presence is perceived by the smell, 282—delicacy of smelling in birds instanced in ducks, v. 11

Savours, mechanical manner of accounting for difference of flavours, ii. 183

Smile,
Sna
vii. 3,
Sia
Gar
---org
---and
and fe
nated
eggs i
and in
the po
they c
to this
so doe
fectual
of win
garden
favour
snail,
with t
brings
experi
times
eggs;
snails f
the se
verges
31---o
among
beasts,
bottom
the sur
is the
more i
times q
by whi
Sna
on a fi
only an
larger
and ha

Smile, Fielding asserts, a person with a steady glavering smile, never failed to prove himself a rogue, ii. 94

Snail, shell of the garden-snail, in what manner formed, vii. 3, *et seq.*

Sea-snail, a cartilaginous fish, described, vi. 284

Garden-snail, is surprisngly fitted for the life it is to live ---organs of life, it possesss in common with animals, vii. 19 ---and what peculiar to itself, 20---every snail at once male and female; and while it impregnates another, is impregnated in turn, 21---coupling of these animals---hide their eggs in great numbers in the earth, with great solicitude and industry, 22---the growth of them, 23---possessed of the power of mending the shell; and come to full growth, they cannot make a new one---Swammerdam's experiment to this purpose, 24---their food 26---salt destroys them, so does foot---a tortoise in a garden banishes them most effectually, 25---continue in a torpid state during the severity of winter---so great their multiplication in some years, that gardeners imagine they burst from the earth---wet seasons favourable to their production, 26---*sea snail, fresh water snail, and land snail*, 27---common garden snail compared with the fresh water snail and sea snail 28---fresh water snail brings forth young alive, with shells upon their backs---experiment made by Swammerdam to this purpose---at all times of the year, fresh water snails opened, are pregnant with eggs; or with living snails, or with both together, 29---sea snails found viviparous, others lay eggs, 30---manner in which the sea snails impregnate each other ---different orifices or verges of snails, the difference between land and sea snails, 31---of the trochus kind, have no mouth---their trunk---are among snails, as the tiger, the eagle, or the shark, among beasts, birds, and fishes, 33---food of all sea snails lies at the bottom---of sea snails, that most frequently swimming upon the surface, whose shell is thinnest, and most easily pierced, is the nautilus, 35---its description, 36---nothing seemingly more impossible, yet is more certain, than the nautilus sometimes quitting its shell, and returning to it again---peculiarity by which the nautilus is most distinguished, 37

Snake, continues for several months together subsisting on a single meal, ii. 125---snakes destroy mice, vi. 73---the only animal in the forest adventuring to oppose the monkey---larger snakes often winding up the trees where they reside, and happening to surprise them sleeping, swallow them

whole, before they have time to make defence, iv. 220.
See *Serpents*.

Black snake, its description and food—are oviparous, vii. 220

Snipe, a water-bird of passage—its description, vi. 23

Snow, inhabitants of places where fields are continually white with snow, generally become blind before the usual course of nature, i. 15—its melting produces a constant breeze, 347

Snow-slips, dreaded by travellers—a family in Germany lived for a fortnight beneath one of these snow-slips, i. 161

Sobbing, is a sigh still more invigorated, ii. 92

Soland goose, belongs to the northern islands; in greatest number on the Bas island, and subsists entirely upon fish, vi. 71. See *Basi* and *Gannet*.

Soldier-crab, like a lobster, without a shell—a native of the West India islands—description, and descent from the mountains, vi. 370

Solfatara, a valley near Naples, described—exhibits the appearance of an earthquake in miniature, i. 123

Sonorous bodies; those who make the tone of such bodies to depend upon the number only, and not the force of its vibrations, mistake an effect for a cause, ii. 164

Soot, as well as salt, will destroy snails, vii. 25

Sore, name the hunters give the buck the fourth year, iii. 128

Sorel, the hunters name for the buck the third year, iii. 128

Sorrel, wood sorrel boiled up with milk, by the Laplanders kept in casks under-ground, to be eaten in winter, iii. 166

Sound conveyed by air, is lost in vacuo, i. 334—sounding bodies of two kinds; unelastic returning a single sound, and elastic rendering a succession of sounds—undulations in elastic bodies, taken by the ear as one continued sound, while, in reality, they make many, ii. 163—those whose differences can most easily be compared, are most agreeable, 166—those musical most pleasing, which are most unexpected, 167—laws of the reflection of sound not so well understood as those of light, 171—persons of a bad ear oft deceived as to the side whence sound comes, 173—trumpets made to increase sounds, 174

Source, rivers have their source in mountains, or elevated lakes, i. 200

Southminster marshes so over-run with an army of mice, that the grass was eat up to the roots, v. 148

Spalanzani, his experiments concerning the power of reproduction in animals, viii. 172

Spaniards, the only people of Europe acquainted with the value of the ass, ii. 385

Spaniels, land and water, the offspring of the beagle, transported into Spain or Barbary, so altered, and converted there, iii. 284—a dog of the generous kind, 286—the land spaniel, 288—the water spaniel, 289

Spanish flies described; their use in medicine, and as blisters, viii. 41. See *Cantbaridis*.

Sparrows, house sparrow, v. 315—various birds of the sparrow-kind—their food, 314—songsters of this class, 316—their migrations, 317—a male and its mate that have young, destroy above three thousand caterpillars in a week, viii. 44.

Sparrow hawk, one of the baser race of hawks, v. 119—taught to fly at game, but little obtained from its efforts—lately asserted, upon respectable authority, the boldest of all for the pleasure of the chase, 131.

Sparus, the sea-bream, its description, vi. 302

Spawn, different seasons for fish to deposit their spawn, 172—always deposited in particular places, where the sunbeams may reach them, vi. 330

Spawning, peculiar preparation of the lamprey for spawning, vi. 268

Spears (burning) a peculiar kind of aurora borealis, i. 390

Spears, the horns of the stag the third year, iii. 113

Spermaceti, the whole oil of the cachalot easily converted into that concrete, vi. 214—efficacy of spermaceti in medicine very small—candles now made much of it are substituted for wax, and sold cheaper, 216

Spermaceti whale, the cachalot, described, vi. 213

Spiders, in South America and Africa, as large as sparrows, ii. 6—the spider for several months together, subsists upon a single meal, 125—chief of our native spiders—not venomous, viii. 249—their description and habitudes—the Martinico spider's body as large as a hen's egg, 250—manner of making their webs, 254—Lister has distinguished the sexes of this animal—their coupling—their number of eggs 260—their bag to deposit their eggs, 261—their parental

2

care; enemies to each other—experiment made by Mr. Reaumur to turn their labours to the advantage of man—gloves made from their webs—found it impracticable to rear them, 262

Water-Spiders inhabit the bottom, yet never wet, but inclosed in a bubble of air, surrounding them on all sides; vii. 264

Spinal marrow and the brain, the first parts seen begun in the embryo, ii. 146

Spinous class of fishes already extended to four hundred sorts, vi. 295—Gouan's system and arrangement of the various sorts of spinous fishes, 299—their general leading marks and difference from others, 311—of those which live in the ocean, the dorado the most voracious, 334

Spirits of wine flame with a candle, not with a spark, i. 83

Spitzbergen, belief that bodies never corrupt there, nor suffer any apparent alteration, though buried for thirty years, ii. 264

Sponges, opinion of count Marfigli about them—that of Rumph and Jussieu set in a clearer light by Mr. Ellis, viii. 193

Spoonbill, descriptions of the European and American spoonbill, vi. 7—its manner of life, 8

Sports, remarkable, on horseback, among the grandees of Guinea, ii. 363—one peculiar to the Italians; in which horses without riders run against each other, 354—of wild asses exhibited in Persia, 377—of the bird-catchers, counterfeiting the cry of the owl, v. 144—cock-fighting in China, India, the Philippine islands, and all over the East, the sport of kings and princes, 163—of hunting the turkey in Canada, 179

Spouts of water at sea common in the tropical seas, and sometimes in our own—description of one in the Mediterranean by Tournefort—solutions offered for this phenomenon, i. 290—broken by guns firing bars of iron at them, which striking them, the water falls from them with a dreadful noise, and no farther mischief—those called typhons, sometimes seen at land, differs from those at sea described by mariners—description of that observed at Hatfield in Yorkshire, in 1687, 394—land-spouts sometimes drop in a column of water at once upon the earth, and produce an inundation—they appear in the calmest weather at sea—facts still wanting to form a rational theory of them, 396

Spout-boles, in the cetaceous tribe, described, vi. 186

Springs, of water, experience alone can determine the useful or noxious qualities of every spring; i. 171—one mentioned by Derham, which he never perceived to be diminished in the greatest drought, when all ponds in the country were dry for several months, 199

Squash, a stinkard, of the weasel-kind, called a pole-cat of America, iii. 380—its description, 381—is said to eat only the brains of poultry—its scent strong enough to reach half a mile round, near hand almost stifling—a drop of the foetid discharge, falling into the eye, might blind it for ever—dogs abate their ardour when they meet the foetid discharge, turn, and leave the squash master of the field, never to be led on again, 384—cows and oxen strongly affected by the stench—and provisions spoiled by it—with planters and native Americans, kept tame about their houses; seldom emitting disagreeable scents, except when injured or frightened—natives eat the flesh, taking care to clear it of the offensive glands, 385

Squinting, many instances of squinting communicated by a father to his offspring, ii. 238

Squirrel, a ruminating animal, iii. 5—classified as such by Pierius, iv. 3—tails are extremely long, beautiful and bushy, and serve them for several purposes, 24—particularly in vast leaps of one hundred yards taken from tree to tree, 25—when the animal eats or dresses itself, it sits erect, like the hare or rabbit, making use of its fore feet as hands, 25—the kind has as many varieties as any wild animal; enumeration of some, 25—its way of moving is by bounds, iv. 32—when tamed, is apt to break away at every opportunity, 37—few animals so tender, or so unfit for a change of abode, 27—some live on the tops of trees, others feed on vegetables below, where also they take shelter in storms—description of its qualities, food, and mansion—the nest formed among large branches, where they fork off into small, 28—the martin destroys the squirrel, then takes possession of its mansion, 30

Squirrels are in heat early in the spring, very diverting to see the female then feigning an escape from the pursuit of two or three males—Nature particular in the formation of these animals for propagation—time of gestation—keeps in the midst of tallest trees, and shuns the habitation of men—the tree but touched at bottom, they quit the nest, and fly to another tree, thus travelling with ease, along the tops of

the forest, until quite out of danger, iv. 31—in Lapland vast numbers remove from one part to another, 32—method of crossing broad rivers, or extensive lakes, 33—they have a sharp piercing note; and another, more like the purring of the cat when pleased, 32—the Laplanders eat their flesh, 34—description of the *common sort*, and of the *grey Virginian* kind, 25—the *Barbary*; *Siberian white*; *Carolina black*; *Brasilian*, 26—the *little ground Carolina*, and *New Spain squirrel*, 27—*Flying squirrel* more common in America than Europe—its food and mansion, 36

Stag, first in rank among quadrupedes, its elegant form described—no obvious difference between the internal structure of the stag and the bull, but to a nice observer, iii. 94—ruminates not so easily as the cow or sheep, reason why, 106—manner of knowing its age—differs in size and horns from a fallow-deer, 95—increase in beauty and stature in proportion to goodness of pasture, enjoyed in security, 104—seldom drinks in winter, and less in spring, 106—different colours of stags, 104—how watchfully he examines an enemy's approach—delighted with the sound of the shepherd's pipe—of animals native of this climate, none such a beautiful eye as the stag, 160—beauty and size of horns mark strength and vigour, 98—time and manner of shedding them, 95—severe cold retards the shedding—horns increase in thickness and height from the second year of age to the eighth, 100—shedding his horns, hides himself in solitudes and thickets, and ventures out to pasture only by night, 96—grow differently in stags from sheep or cows, 97—horns found to partake of the nature of the soil, iv. 100—a mistake that horns take colour of the sap of the tree against which they are rubbed, iii. 101—stag, castrated when its horns are off, they never grow again, the same operation performed when they are on, they never fall off—one testicle only tied up, he loses the horn of the opposite side—Mr. Buffon thinks the growth of the horns retarded by retrenching the food, 98—horns resembled to a vegetable substance, grafted upon the head of the stag, 99—time of feeling impressions of rut, or desire of copulation, 101—effects the rut causes, 102—stag lives about forty years, 103—voice in the time of rut terrible—and then keeps dogs off intrepidly—a stag and tiger enclosed in the same area, the stag's defence so bold, the tiger was obliged to fly, 106—the stag in rut ventures out to sea from one island to another, and swims

best when fattest, 107—the hind, or female, uses all her arts to conceal her young from him, the most dangerous of her pursuers, 108—men of every age and nation made the stag-chace a favourite pursuit, 108—stags remaining wild in England, called red-deer, found on moors bordering Cornwall and Devonshire, 111—manner of hunting the stag and buck in England, 112—different names given them, according to their ages, 113—terms used by hunters pursuing the stag, 113—the manner of knowing the track of a stag—and that of an hind—he changes his manner of feeding every month; in what manner, 115—swims against the stream, 119—the ancient manner of pursuing him—that of hunting him, 119—and in China, 121—stag of Corsica—a kind called by the ancients *trekelophus*—Germans call it *bran-deer*, or *brown-deer*, 122—a beautiful stag, thought a native of Sardinia, though perhaps of Africa or the East-Indies—its description—*stag-royal*, in Mexico, 123—of *Canada*, brought into the state of domestic tameness as our sheep, goats, and black cattle, 124

Staggard, name of the stag the fourth year, iii. 113

Stallions, law prohibiting exportation of stallions and mares; and another similar, obtained as early as the times of Athelstan, ii. 369

Stanislaus, the exiled king of Poland, had a dwarf at his court in Luneville—described, ii. 255

Star, bird classed with the thrush, distinction from the rest of its tribe—its residence—its eggs—it is easily taught to speak—its food, v. 323

Star-fish, general description of the tribe—substance of their bodies almost as soft as water, no way injured by swallowing shells almost of a stony hardness, viii. 174—float upon the surface of the sea, and in the dark send forth a shining light resembling that of phosphorus—are also called *sea-nettles*—the passage for devouring food, serves to eject excrements—taken and put into spirits of wine, continue many years entire, but left to influence the air, in four and twenty hours melted down into a limpid offensive water, 175—cut in pieces, every part survives the operation, becoming a perfect animal, endued with its natural rapacity, 176

Starling, slender-billed bird of the sparrow-kind, living upon insects, v. 314—often lays eggs in holes deserted by the wood-pecker, 253—time of migration, 32

Stars, fixed, supposed by philosophers suns resembling that which enliven our system, i. 6

Stars, falling, meteors or unctuous vapours raised from the earth, kindled and supported in the air, until they fall back extinguished, i. 390

Statues of antiquity first copied after human form, now become models of it, ii. 106

Stature, middle in men, from five feet to five feet eight inches, ii. 108—cause of different statures, 237—ordinary of men, Mr. Derham observes, probably the same now as at the beginning—many corroborating proofs of this, 264

Stellaris, name given by the Latins to the bittern, vi. 5

Steno, his opinion about the formation of the incipient animal, ii. 17

Stephen, in this king's time the number of horses in London amounted to twenty thousand, ii. 370

Stigmata, holes through which caterpillars breathe, viii. 13—famous experiment of Malpigi to verify this—viii. 14

Stickleback, the gasterosteus of the prickly-finned thoracic sort, description of this fish, vi. 306—this fish appears in quantites every seven or eight year in the river Welland, near Spalding; a man employed by a farmer to take them, for manuring his grounds, got, for a considerable time, four shillings a day, selling them at a halfpenny a bushel, 328

Stillicon, his two daughters, betrothed, one after the other, to the emperor Honorius, buried with much finery, found eleven hundred years after in good preservation, excepting the pearls, vii. 57

Stinkards, name given by our sailors to one or two animals of the weasel-kind, chiefly found in America, iii. 380—and by the savages of Canada to the musk-rat, iv. 80

Stint, smaller and shorter-billed water-bird of the crane-kind, vi. 23

Stoat, the ermine, its description, iii. 353

Stomach, Nature has contracted the stomach of animals of the forest, suitable to their precarious way of living, ii. 124—proportioned to the quality of the animal's food, or the

ease of obtaining it—those who chew the cud have four stomachs, 317, iii. 3—yet several of those have but two in Africa, ii. 317—names of the four stomachs, iii. 3—stomach of carnivorous animals small, 2—those of ruminating strong and muscular, 5—of insects composed of muscular fibres, 6—the camel has a fifth stomach, as a reservoir of water for occasional use, iv. 307—birds have, properly, but one stomach, yet this is different in different kinds, v. 14—that of the cuckoo enormous, reaches from the breast-bone to the vent, 266

Stork, a ruminating bird, iii. 5—true difference between it and the crane, v. 382—are birds of passage—returning into Europe in March—places for their nests—number of eggs—are a month in hatching; and their young excluded, they are particularly solicitous for their safety—their food in a great measure frogs and serpents, v. 383—the Dutch attentive to the preservation of the stork in their republic, the bird protected by the laws, and the prejudices of the people—countries where found—ancient Egyptian's regard for this bird carried to adoration—the antient ibis supposed the same which at present bears the same name; a bird of the stork kind, about the size of a curlew, 384

Storms, foretold by the barometer, i. 352—above their region all is calm and serene, 353—rise to the tops of the highest mountains—confirmed by those who have been on the Andes, and by the deep snows that crown them, 153—with powerful effects, do not shew great speed, 356—one most dreadful in Hertfordshire, in 1697—description of it, 375—do not terrify goats, iii. 53

Stones, shower of stones, and other matters raised by storms in one country, carried to another, fall suddenly as showers of rain, i. 390

Stone of the shammy, generally about the size of a walnut, and blackish—formerly in request for the same virtues with oriental bezoar, iii. 69

Stone-chatter, slender billed bird of the sparrow-kind, v. 314—migrates, iii. 318

Stove, its warmth expeditious for hatching, and efficacious in bringing the animal in the egg to perfection, ii. 27

Strabism, an inequality of sight, and particular cast of the eye; whence it proceeds, ii. 157

Stream of rivers, more rapid in proportion as its channel is diminished, and why, i. 205—the surface swifter than the bottom, and why—*islands*, turnings, and other obstacles retard the course but inconsiderably, and why, 206

Strength, a just way of estimating human strength, by perseverance and agility of motions, ii. 114—not hereditary, 116—prodigies of it in Maximin the emperor described—instance of it in Milo, and also in Athanatus, 118—estimation of strength in animals by the bulk of their muscles very fallacious; thin and raw-boned men being generally stronger and more powerful than those seemingly more muscular—women much inferior in strength to men, 120—of man less valuable since the invention of gunpowder, of new machines, and the application of the power of animals to the purposes of life, 119—of the inhabitants round the poles is amazing, 218—the comparative strength of an horse, measured, not by what he can carry, but by what he can draw, 114

Strepsicheros, a third variety of sheep with straight horns, a native of the islands of the Archipelago, ii. 48

Stromateus, a soft-finned apodal fish, described, vi. 305

Strong, human body, for its size, stronger than that of other animals—comparing the strength of a lion with that of a man, to be remembered the claws of this animal give a false idea of its power; and lead to ascribe to its force what is only the effects of its offensive arms, iii. 111

Struthophagi, some nations so called from their fondness for the flesh of the ostrich, v. 59—their method of taking it, 61

Stuffs made of hair of animals about Angora, iii. 58—half composed of silk, forbid to be worn at Rome, as a luxurious refinement, 49

Stunts, name given to whales at the age of two years, vi. 200

Sturgeon, a cartilaginous fish, of a considerable size, yet flies terrified from the smallest fishes—its description—three kinds of it, vi. 271—countries of Europe this fish visits at different seasons—annually ascends the largest rivers to spawn, and propagates in vast numbers—enjoying the vicissitude of fresh and salt water, then grows to an enormous size, almost to rival the whale, vi. 272—the largest caught

in Great-Britain taken in the Eske, where frequently found weighing four hundred and fifty pounds, 273—places where caught in numbers, 272—never by a bait, always in nets, 273—their food---whence the German proverb, *he is as moderate as a sturgeon*, 274—live in society among themselves; and Gesner has seen them shoal together at the notes of a trumpet—usual time of coming up rivers to spawn—at Pilau the shores formed into districts, and allotted to companies of fishermen, and rented some for three hundred pounds a year—nets in which caught—in the water it is one of the strongest fishes, and often breaks the nets that enclose it, but its head once raised above water, its activity ceases, 275—has broke fishermen's legs with a blow of its tail—two methods of preparing it, 276—that from America not so good as from the north of Europe—caviar made with the roe of all kinds of sturgeon—manner of making it, 277

Sturme, the captain who descended into Penpark-hole, where remaining five hours, cost him his life, i. 66

Sucking-fish, the remora, sticks to the shark—also called the shark's pilot, and why, vi. 242

Sucking-fish, the echeneis, a soft-finned thoracic fish, its description, 306

Suction, from whence that amazing power in the lamprey arises, 264

Sugar, the white sort in the tropical climates sometimes full of maggots, i. 314

Sulphur, with iron filings kneaded together into a paste, with water when heating, produces a flame, i. 76

Sun, its warmth efficacious in bringing the animal in the egg to perfection, ii. 27—not easy to conceive how it whitens wax and linen, and darkens the human complexion, ii. 235—mock-suns and other meteors seen in the Alps, i. 145—in the polar regions, 377—reflected upon opposite clouds, appear like three or four real suns in the firmament—real sun always readily known by superior brightness—the rainbow also different in those countries, 388

Sun-fish, an anomalous cartilaginous fish, like a bulky head, its description, vi. 281

Surf of the sea, name the mariners give the rising waves, breaking against the shore, i. 273

Surinam rat, the phalanger, a small monkey described, iv. 248

Surinam toad, the pipali, a hideous toad, its description, vii. 108

Surmalot, with Mr. Buffon, the great rat, a hateful rapacious creature, described, iv. 65

Surmulet, the mullus, a spinous fish, its description, vi. 308

Swallows, time of their migrations—departure of some, and retreat of others into old walls, from the inclemencies of winter, wrap the migrations of birds in great obscurity, v. 37—experiment of Mr. Buffon to this purpose, 38—with us birds of passage; breed in upper Egypt and the land of Java, and never disappear, 318—*boufe-swallow*, 347—characteristics of the swallow tribe, 347—their food—have the greatest swiftness and agility, 348—at the end of September they depart; some feeble wretched families compelled to stay, perish the first cold weather, 351—those migrating first seen in Africa, in the beginning of October, having performed their journey in seven days—sometimes seen, interrupted by contrary winds, wavering in their course at sea, and lighting upon the ships in their passage—a doubt whether all swallows thus migrate, or some other of this species externally alike, and internally different, be differently affected by the approach of winter, 352—observations made to this purpose by Reaumur, Frisch, and Klein, 353—indicate approaching change of weather—their nests, and those they build on the coast of China and Coromandel, 349—Chinese pluck them from rocks, and send great numbers into the East-Indies for sale—gluttons esteem them great delicacies dissolved in chicken or mutton broth—the number of their eggs, 350

Swallows of Ternate, or *God's birds*, the bird of paradise, described, v. 257

Swammerdam, lent attention to testaceous animals, almost exceeding credibility; has excelled the insects he dissected, in patience, industry, and perseverance, vii. 17

Swan, a stately web-footed water-fowl; though an indifferent figure upon land, is beautiful in the water, vi. 111—doubt whether the tame kind be in a state of nature—none found in Europe—the wild swan, though strongly resembling it in colour and form, yet another bird—differences between wild

and tame swans, 112—considered a high delicacy among the ancients, 109—the tame most silent, the wild has a loud and disagreeable note—from thence called the hooper, 113—accounts sufficient to suspend an opinion of its musical abilities, 113—their food, nest, and number of eggs, 116—a blow with the pinion breaks a man's leg or arm—two months hatching, and a year growing to proper size—longest in the shell of any bird—said to live three hundred years—by an act of Edward IV. the son of the king was allowed to keep a swan, and no others, unless possessed of five marks a year, 117—punishment for taking their eggs, imprisonment for a year and a day, and a fine at the king's will—places which abound with them, 118

Swarms of a bee-hive, several swarms in the year, the first always the best and most numerous, viii. 86

Sweden, affes a sort of rarity in Sweden, ii. 385

Sweetmeats, in tropical climates, exposed by day in the sun, to prevent their putrifying by the night-air, i. 314

Swift, a bird of the swallow-kind; peculiar position of the toes, v. 346

Swiftness of savages, many surprising stories about it, ii. 115—of the zebra, a proverb among the Spaniards and Portuguese, 396

Switzerland, the peasants kill a cow for their own table, salt and hang it up, to preserve as a delicacy the year round, iii. 9

Sword-fish, the xiphias, its description, vi. 300—its terrible encounters with the whale described, vi. 200

Synaguses, carnivorous animals, like the jackall and wolf, hunt in packs, and encourage each other by their cries, ii. 322

Symmetry, and proportion of the human body, ii. 79

Sympathetic, affection of yawning, ii. 91—a ridiculous instance of it practised upon professor M^r Laurin, at Edinburgh, 92

Synovia, a lubricating liquor in the joints, so called by anatomists, ii. 109

Syria, noted country for long soft hair of the animals bred in it, iii. 212—most of its cities destroyed in 1182, by an earthquake, i. 111

Syrian-rabbit, an instance of the length of its hair, iv.

System, in what manner the harmony of our planetary system is preserved, i. 4—very useful in natural history, ii. 290—books containing them, useful to be consulted, but unnecessary to be read, 292—that of Linnæus deserves the preference, 293—faults of systematic writers in natural history, ii. 292—what has given birth to the variety of systems in natural history, 300—of Mr. Gouan concerning spinous classes of fishes, vi. 300—use of it, 310

T.

Tabbies, streaked cats, to which the civet's colour is compared, iii. 390

Tajacu, the peccary, an animal of the hog-kind, peculiar for a lump upon its back, with glands discharging a musky substance, iii. 183

Tails of sheep a foot broad, and weighing from twenty to thirty pounds, sometimes supported by a board upon wheels, iii. 47

Tail, use made of it by the whale, vi. 192—is about twenty-four feet broad, 191

Talapoin, eight division of monkeys of the ancient continent—its description, iv. 334

Talons, in what manner produced in animals, ii. 110

Tamaim, a monkey of the second sort of the sagoin-kind—description, iv. 237

Tamandua, an ant-bear, larger and smaller, live upon ants—their description, iv. 338

Tamis-bird, one of the names of the Guinea hen, described, v. 192

Tanais, the Don, a principal river of Europe, parting it from Asia, i. 209—affords great numbers of sturgeon, vi. 273

Tanusc, of the hedge-hog kind, different enough to constitute another species, iv. 105—covered with prickles, though mixed with hair—does not defend itself by rolling up in a ball—only found in the East-Indies—sleeps several months, and loves to be near water, 106—in the torpid state its hair falls off—Indians consider its flesh a delicacy, 107

Tapeti, the Brasilian rabbit, in shape like the English—has no tail—does not burrow—lives at large, like the hare—is twice the size of a dormouse, iv. 54

Tapir, the largest animal of America, no way comparable in size to the elephant of Africa, ii. 332—considered as

the hippopotamos of the new continent—its description, resides in the water, iv. 331—its food—its flesh thought a delicacy, 332.

Tar, used by the Laplanders for all disorders of the reindeer, iii. 169.

Tarantula, the bite of this animal, and its cure by music, all a deception—instance of it, ii. 171—native of Apulia in Italy—description—its bite not attended with dangerous symptoms—fable of its virulence, vii. 265.

Tarcel, name falconers give the male bird of prey; and why, v. 84.

Tariguagua, ruggedness of road from it up to the Andes, is not easily described, i. 149.

Tarnassar, great bird in the East Indies, no other than the condor, vi. 105.

Tarsier, a monkey, last of the class of the opossum kinds—its description—why so called, iv. 248.

Tartars, their religion consists in part by managing their whiskers—they waged a bloody war with the Persians as infidels, not giving their whiskers the orthodox cut, ii. 96—the Ostiac, a race travelled down from the North, and originally sprung from minute savages, 219—Samoeid, first distinct race of men round the pole, described, 213.

Tartar horses serviceable in war—how broke—particulars concerning them, ii. 364.

Tartary, in general, comprehends great part of Asia—description of natives and manners, ii. 219.

Taste, in all substances on mountain tops, and valley bottoms, i. 335—to determine somewhat upon the nature of tastes, bodies to be tasted must be moistened, or dissolved by saliva, to produce a sensation, the tongue and body to be tasted, being dry, no taste ensues—tastes rendered agreeable by habit—relish of tastes stronger in children than in persons advanced in life, ii. 183—highest epicure has the most depraved taste, 184.

Tatou, or armadilla, a quadrupede of the new continent, covered with shells, ii. 124. See *Armadilla*.

Tatu-apara, first of the kinds of armadilla—the second, the tatou of Ray, or the encombert of Mr. Buffon—the third, the tatuette—their diversities described, iv. 132.

Teal, smallest bird of the duck-kind distinguished, vi. 130.

Teats, great variety of them in animals—their form, and how placed, ii. 103.

Teeth in cows, eight cutting teeth in their lower jaw—manner of renewing them, iii. 111

Tegg, what the hunters call the doe the second year, iii. 128

Tejugucau, tockay, and cordyle, all of the lizard kind, gradually less, fill up the chasm between the crocodile and the African iguana, vii. 149

Tempests, loudest formed by united contributions of minerals, vegetables, and animals, increasing the streams of air fleeing round the globe, i. 336—frequent under the tropics, and a space beyond them, 356—tempests of sand, deserts raised in one country, and deposited on another, 357—in Arabia and Africa described, 363

Teneriff (the peak of) computed a mile and a half perpendicular from the surface of the sea, i. 153

Teneriff (island of,) the art of embalming preserved among the ancient inhabitants, when conquered by the Spaniards, ii. 272

Tendrack, an animal less than a mole, different from the hedge-hog, and a different species, iv. 105—description—grunt like hogs, and love to be near water—they multiply in numbers—sleep several months, 106—its flesh a great delicacy with the Indians, 107

Ternate, a Molucca island, its swallow taken for the bird of Paradise, v. 260

Terrier, first division of dogs of the generous kind, used for hunting, iii. 286

Tessaceous, substances in variety on the tops of mountains, and in the heart of marble, i. 17

Tessaceous, animals—Swammerdam lent an attention to those animals exceeding credibility, vii. 17

Thales the philosopher, held all things made of water, i. 166

Thames water, and that of the Indus, most light and wholesome, i. 170

Theories of the earth, those of the most celebrated authors, i. 22

Theory of evaporation, for the formation of clouds, i. 370—other theories upon that subject, i. 368—theory of sympathy, of father Mallebranche, beautiful upon monstrous productions, ii. 246

Therafia, an island appeared unexpectedly to mariners on other pursuits, i. 125

Thermometer, measures heat and cold by a fixed standard—description, i. 177—shews the heat of blood; in man, and most animals, about thirty degrees above congelation—in the marmotte, and other torpid creatures, not above ten; and in the body of a living dormouse, never beyond the usual pitch in air, sometimes a degree below it, iv. 45

Thessaly, the horses there reputed excellent for war, ii. 365

Thentys, a prickly-finned abdominal fish—description of it, vi. 306

Thibet, the musk from thence reckoned the best—sells at fourteen shillings the ounce, iii. 93—the peacock there the most beautiful of the feathered creation, v. 176

Thoracic fish, that which has the ventral fins directly under the pectoral fins, vi. 303

Thoulouse bodies buried in the monastery of Cordeliers in that city, do not putrify, ii. 276

Throat of the great Greenlander whale is so narrow, that any animal larger than a herring could not enter, vi. 198—but that of the cachalot can with great ease swallow an ox, 215—that of the shark most amazing, 234

Thrush, a slender billed bird of the sparrow kind, v. 314—its distinction from all of the kind---its song very fine---the largest of the tribe with a musical voice, 320---its food, 321

Thumb-footed shell-fish, testaceous, described, vii. 64

Thunder, Ulloa heard it rolling beneath him, when upon the Andes, i. 152---its cloud always moves against the wind, 353---a sound produced by the opposition of two clouds, and continued by reverberated echo---thunder clears the air, and kills insects noxious to vegetation, 374---resembled by the roaring of the lion heard in the night, and re-echoed by the mountains, iii. 224

Thursid cartilage forms a lump upon the wind-pipe in men, not seen in women, ii. 102

Tides, with Pliny, were influenced partly by the sun, and in a greater degree by the moon, i. 251---Kepler first conjectured attraction the principal cause of them---the precise manner discovered by Newton, 252---high tides happen at the same time, on opposite sides of the globe, where waters are farthest from the moon, 253---solar and lunar tides---greatest in syzigies, least in quadratures, 255---flows strongest in narrowest places, 256---Mediterranean, Baltic, and Black Sea, no sensible tides, the gulf of Venice excepted; and

why, 257---higher in the torrid zone, than in the rest of the ocean---greatest at the river Indus, rising thirty feet, 257---remarkably high on the coasts of Malay, in the straits of Sunda, the Red Sea, the gulf of St. Lawrence; along the coast of China and Japan, at Panama, and in the gulf of Bengal---those at Tonquin most remarkable in the world; one tide, and one ebb, in twenty-four hours; twice in each month no tide at all, 258---in the straits of Maggellen it rises twenty feet, flows six hours, and the ebb lasts but two hours, 256

Tiger, often bigger than the lion---nothing tames it---perfectly resembles the cat, iii. 234---leaps twenty feet at a spring, ii. 322---three sorts in Sundah Rajah's dominions, iii. 240---the royal tiger---carries a buffalo over its shoulder to its den, 241---attacks the lion, 225---defeated by a stag, 106---taught to defend herds, iii. 199---said to follow the rhinoceros for its excrements, iii. 236---other tales about it, 244---under Augustus, a tiger an extraordinary sight---the species scarce---opinion of Varo, that it was never taken alive, 242---the ancients commended it for beauty among quadrupedes, equal to that of the peacock among birds, 233---supposed to bring forth four or five young at a time, 242---expresses his resentment as the lion---the skin esteemed in the east, particularly in China, 243---battle of one tiger and three elephants at Siam described, 239---another between a crocodile, 247---the red tiger, Mr. Buffon's cougar, 244---common in Guinea Brazil, Paraguai and other parts of South America 248---the flesh superior to mutton, 249---and esteemed by the negroes as a dainty, 298

Tiger-cat, or cat-a-mountain, the ocelot of Mr. Buffon---a beautiful animal of its kind, iii. 255

Tigais, a great river in Asia, lost under mount Taurus, i. 224

Tingitians and Egyptians famous for the finest horses in size and beauty, ii. 356

Tipula (water) of the second order of insects---description of it, vii. 358

Tipula, long legged gnat, description of this insect---only difference between it and the gnat, viii. 151

Titmouse, a slender-billed bird of the sparrow-kind, v. 314

Toad, differences between the frog and it, as to figure and conformation, vii. 73---their nature, appetites, and food---

coupling, 92---difficulty in bringing forth, 93---curious particulars relating to this animal, 95---one swallowing a bee alive, the stomach stung, and the insect vomited up again, 97---toads not venomous---accounts of toads taken inwardly, 98---their flesh eaten as a delicacy on the coast of Guinea, iii. 298---an harmless, defenceless creature, and unvenomous---torpid in winter---retreat then---difficult to be killed, vii. 100---lives for centuries in a rock, or within an oak, without access, nourishment, or air, and yet found alive and perfect---accounts of this, 101---toads suck cancerous breasts, and perform a cure---progress of this operation, 102---the rubeth, the land-toad, alone has the property of sucking, 105---doubtful whether they die by internal or external application of the cancerous matter---varieties of the animal, 106---some bigger than ducks, ii. 6---description of the Surinam toad, called pipal, 108

Tacoco, sort of cry, given as a name in Canada to the flamingo, and why, vi. 16

Toes, usually four in all animals of the poultry kind; in a species of cock amount to five, v. 158

Tone, a continuing tone produced from a non-elastic body, repeating blows quick and often, ii. 163---of a sonorous body made to depend upon the number of vibrations, not the impelling force, is mistaking an effect for a cause, 164---half tones rejected in all countries, where music is in its infancy, as in China, 166

Tongres, a city in the county of Liege, formerly encompassed by the sea, and at present thirty-five leagues distant from it, i. 276

Tongue, the flamingo's much celebrated, and larger than that of any bird, vi. 15---of the great Greenland whale, fills several hogshheads with blubber, 194---of the rein-deer, a great delicacy, iii. 167

Tonguin, tides there the most remarkable in the world, i. 258

Teeth, coloured, the passion for them in China and Japan---in some parts of India black teeth desired with ardour, ii. 77---teeth of animals various---how formed in man, 101---of the elephant, shed like horns of deer, or obtained after death, not yet known---natives of Africa find them in their forests, iv. 281---of the narwhale surpasses ivory, vi. 210---ascribed to a different animal---curiosity, and the desire of

scarce things, made them very valuable a century ago, 212
—the white shark is said to have one hundred and forty-four
teeth, 235

Tornado, a formidable tempest, so called by the Spaniards
—its description and dreadful effects, i. 361

Torpedo, its description, vi. 257—by an unaccountable
power, the instant touched, even with a stick, when im-
mediately taken out of the sea, it numbs the hand and arm, or
whole body, 258—the shock resembles an electrical stroke;
sudden, tingling, and painful—account by Kempfer of
numbness produced by it, 258—he believes holding in the
breath prevents the violence; implicit belief of efficacy
would be painfully undeceived, 259—this power not ex-
erted upon every occasion—trials by Reaumur to this pur-
pose—opinions concerning the cause of this strange effect,
260—the fish dead, the power destroyed, then handled, or
eaten with security—the power not extended to the degree
some believe, reaching the fishermen at the end of the line,
or numbing fishes in the same pond—ridiculous excess of this
numbing quality in the history of Abyssinia, by Godignus
—Lorenzini, from experiments, is convinced the power re-
sides in two thin muscles of the back, 262—several fishes
have acquired the name of torpedo, possessed of the same
quality—Moore's and Condamine's accounts of them,
263

Tortoise, ranked among crustaceous fishes, though supe-
rior to them all—amphibious, according to Seba, distin-
guished in two classes, the *land tortoise*, and the *sea turtle*, vi.
374—differ more in habits than conformation, 375—de-
scription, 376, 377—principal distinctions, 378—varieties
are, *trunk-turtle*, *loggerhead*, *hawks-bill*, and *green-turtle*,
390—all generally found in warm countries, without reti-
ring, 387—the shell never changes, and growing with the
body, is formed in pieces, 386—a defence against dan-
gerous attacks, 380—the blood warm and red, 376—how
circulated, 377—turtle larger than tortoise, 387—weighs
from fifty to five hundred pounds—ancients speak of some
of amazing size, 393—live to eighty and an hundred and
twenty years, 381—can live without limbs, head, or brain,
proved by experiments of Rhedi, 380—moves with great
weight upon it, 374—hears distinctly by means of an audi-
tory conduit opening into the mouth, 398—sighs when ill

situated, and sheds tears when distressed, 399---torpid during winter, sleeping in some cave, and breathing imperceptibly, 383---account of a land tortoise caught in a canal at Amsterdam, 374---and of a turtle in the Loire, in 1729, 388---the food chiefly vegetables, though believed to eat insects, snails, and bugs, 386, vii. 25---See *Turtles*.

Toucan, a bird of the pie-kind, has a bill as large as its body---of five varieties; the red-beaked described, v. 243---its food, 244---pepper voided unconnected by the toucan, preferred to that fresh gathered, 244---Pozzo bred one tame---its habits and food, 245---has birds, men, monkeys, and serpents to guard against---scoops out its nest into the hollow of some tree, leaves scarce room to go in and out, and with its great beak guards that entrance, 246---found only in warm parts of South America, where it is valued for its tender and nourishing flesh, and the beauty of its plumage, particularly the breast, the skin of which the Indians dry, and glue to their cheeks for beauty, vi. 243

Touch, those parts of the body most exercised in touching, acquire the greatest degree of accuracy---the fingers, by long habit, not from a greater quantity of nerves, become masters in the art, ii. 185

Tournesfort, describes a spout seen in the Mediterranean, i. 390---solutions offered for this surprising phenomenon, 393

Trachinus, the weever, a prickly finned jugular fish, described, vi. 300

Trachipterus, the sabre, a prickly-finned thoracic fish---its description, vi. 303

Track of a stag, manner of knowing it, and that of a hind, iii. 115

Trade, of hair of animals, driven by the inhabitants of Angora, iii. 58

Tragelaphus, name of a stag with the ancients---found in the forests of Germany, and called by the natives bran-deer, or the brown deer, iii. 122

Traps for horses, used by the Arabians for the wild sort, ii. 348---for wild asses, also used in the Archipelago, 377---for mice, described in variety by Gesner, iv. 74

Treacle, food for bees during winter, when robbed of their honey, viii. 75

Trees, (fossil) in the body of solid rocks, and deep under the earth upon which they once grew—conjectures upon this subject, i. 49—found in quantities at the mouth of the river Nefs in Flanders, at the depth of fifty feet, 281—laying twenty feet deep under ground for many ages, becomes hard and tough, proofs of alternate overflowings and desertions of the sea, 284—usually of the largest kinds in wild uncultivated wildernesses, in the state of rude nature, ii. 16—the banana and plantane, so immense, as to be inimically inhabited by monkeys, snakes, and birds of the most delightful plumage, v. 255—age known by the number of their circles, vi. 174

Trembley, first discovered in the polypus the power of reproduction in animals, viii. 173

Trichurus, a prickly-finned apodal fish of a sword-like form, described, vi. 300

Trigla, the gurnard, of a spinous kind, description of this fish, vi. 303

Trochus, the snails of that kind have no mouth—their trunk—are among snails, what the tyger, eagle, or shark are among beasts, birds, or fishes, vii. 33

Trogodyte of Bontius, is the ouran-outang, or wild man of the woods, iv. 189

Trogodytes, the mountain of that name in Arabia has a passage made through it by a disraption, as if artificial, i. 157

Tropical seas, are those in which spouts are seen very commonly, i. 390—the climates so hot, dogs in process of time lose the delicacy of their scent entirely, and why, iii. 262—under them, and for a good space beyond, tempests are frequent, and their effects anticipated, i. 356—supposed by Linnæus the native spot of man, and the northern climates only places of sojourning for them—an argument sufficient to prove the contrary, ii. 240

Trumpets, increase sounds, in the same manner as the telescope does bodies—persons hard of hearing find the same advantage in the trumpet made for this purpose, that the short-sighted persons do from glasses; were they farther enlarged, they could be used to advantage only in a place of solitude and stillness, as the multitude of sounds would produce tumult and confusion, ii. 174

Trunks of animals, that of the elephant described, iv. 259
that of the gnat may justly be deemed one of Nature's master-pieces, viii. 134

Trygon, the fire-flare; the enchantress Circe armed her son with a spear headed with the spine of this fish; vi. 256

Tubes of glass, drawn as fine as a hair, still preserve their hollow within; i. 192

Tubular vessels, discovered by Fallopius, and called his tubes, ii. 17

Tufted-duck, a variety of the kind, native of Europe, vi. 126

Tumble-dung, a strong beetle, remarkable for make and manners; viii. 137

Tumbler, in the division of Dr. Caius, a dog of the first class, or generous kind; iii. 286---supposed the lurcher, and described, 288

Turbinated shells, are univalves, and the first kind of Aristotle's division; vii. 12

Turbits, variety of the tame pigeons, obtained by cross breed, v. 293

Turbots, (and rays) extremely delicate in their choice of baits; a piece of herring or haddock twelve hours out of the sea, and used as a bait, will not be touched; vi. 253---growth of turbot, 334

Turkey, bird of the poultry kind---its native country disputed; arguments for the old and new continent---first seen in France, in the reign of Francis I. and in England in the reign of Henry VIII. v. 177---its tenderness with us; when young, argues not for our climate---in the wild state; hardy and numerous in the snowy forests of Canada---also larger and more beautiful than in the domestic state---the savages weave the feathers into cloaks; and fashion them into fans and umbrellas, 178---hunting the turkey a principal diversion with them, its flesh chiefly supporting their families---manner of hunting, 179

Turkeys, a stupid, vain tribe, quarrelling among themselves---the cock's antipathy to red; bristles; and flies to attack it---manner of increasing their animosity for diversion---weak and cowardly against the weakest animals that dare face them, 180---the cock pursues what flies from him, as lap-dogs and children; then returns to his train, displays

his plumage, and struts about—the female milder, gentler, and particularly fond of ants and caterpillars' eggs—lays eighteen or twenty eggs, larger than a hen—the young very tender at first, must be carefully attended to, 180—account of Abbé Pluche, of a turkey-hen and her brood at the sight of a bird of prey, 182—turkeys of Norfolk the largest of this kingdom, some weigh thirty pounds; in East India, in the domestic state, grow to weigh sixty pounds, 183

Turkey, in Asia, has in different parts horses of almost all races, ii. 361—lions found to diminish in number in this country, iii. 215

Turnings of rivers, more numerous as they approach the sea, become indications through trackless lands—the bends increasing, form different channels and mouths into the sea, as the Danube, Nile, Wolga, i. 203

Turnspit, a dog of the mongrel-kind, and the lower class of Dr. Caius's division, iii. 285

Turnstone, a small bird of the crane-kind, vi. 23—likes colder climates in summer, or wildest and moistest parts in this country—is a bird of passage, 28

Turtle-dove, one of the ruminating birds, or with a power of disgorging food to feed its young, iii. 5

Turtle, propagated on shore only—comes from sea on purpose in coupling season, vi. 394—female is passive and reluctant; the male is slow, but grasps so fast nothing can loose the hold, 395—prepares for laying, and deposits her eggs in the sand, where in twenty-six days they are hatched by the sun, 385—lay from one hundred and fifty to two hundred in a season, 385—the young from the egg, with their shell, seek their food untaught, and at the size of quails, run by instinct to the sea, ignorant of all danger, 385

Turtle, article of commerce, the shell put to many uses; of the *hawk's-bill* the finest, consists of eight flat, and five hollow plates, vi. 390—how manufactured, 397—the flesh, particularly of the *green turtle*, prized as a delicacy, and is wholesome, 392—the *great Mediterranean* the largest of all, unfit and unsafe to eat; its shell is unprofitable for use, 387—several ways of catching turtles, 398

Tusks, of the *babyrouessa* a fine ivory, smoother and whiter than the elephant's, but not so hard—of enormous size,

iii. 194—of castrated animals scarce appear without the lips, 197—those of a boar, sometimes a foot long, 172—broken, abate his fierceness and venery, producing nearly the same effect as castration, 197—of the mammoth weigh four hundred pounds; those of the elephant from Africa, two hundred and fifty—some remarkable lately found near the Ohio, and Miame in America, vi. 278—Dr. Hunter thinks them of a larger animal than the elephant, iv. 283—of the narwhale, or sea-unicorn, a cetaceous fish with teeth, from nine to fourteen feet long, vi. 208

Twins, never while infants, so large or strong as children that come singly into the world, and why, ii. 48

Typhons, spouts so called seen at land, differ in several respects from those at sea, i. 394

Tyson, (Dr.) his description of an ouran-outang, by the name of *pigmy*, the best and most exact, iv. 191

U.

Valerian, a plant of which cats are excessively fond, iii. 206

Valle, (Pietro) his description of Persian horses, ii. 361

Vampire, a foreign bat, having the reputed faculty of drawing blood from persons asleep; and thus destroying them before they awake, iv. 144. See *Bat*.

Vanferre, a sort of ferret of Madagascar, according to Mr. Buffon, iii. 362

Vapour of metals in mines not so noxious, as those of substances with which ores are usually united, such as arsenic, cinabar, &c.—fragrance of their smell—warnings about them, i. 79—disengaged from water, and attenuated, ascends into the atmosphere, where condensed and acquiring weight as it rolls, falls down in a shape suitable to the temperature of its elevation, 370—most foetid, breathed from the jaws of the wolf, iii. 323

Varenius, his opinion upon the formation of rivers, i. 199

Vari, a kind of maki, last of the monkey kind, iv. 240—its description, 241

Vault, *go to vault*, phrase used by hunters when the hare enters holes like the rabbit, iv. 10

Vegetables, totally unprotected, and exposed to every asailant, ii. 2—those in a dry and sunny soil, are strong and vigorous, not luxuriant; and those the joint product of heat and moisture, are luxuriant and tender, 5—but few noxious—that life as much promoted by human industry, as animal life is diminished, 13—not possessed of one power which animals have, the actual ability, or awkward attempt at self-preservation, viii. 163—vegetable-earth—the bed of it in an inhabited country, must be always diminishing, and why, i. 56—plant, with a round bulbous head, which, when dried, becomes of amazing elasticity, grows near the extremity of that region, on mountains, where continual frost reigns, 151—vegetables cover the bottom of many parts of the sea, ii. 6—those called marine grow to a monstrous size, viii. 179—different kinds appropriated to different appetites of animals, and why—birds distribute the seeds of vegetables where they fly, ii. 5—the ass gives preference over others to the plantane, 381—the sole food of ruminating animals, iii. 1—animals feeding on vegetables most inoffensive and timorous, iv. 3—some possessed of motion—what constitutes the difference between animal and vegetable life, difficult, if not impossible to answer, viii. 161—like fluids and mineral substances, produce air in a copious manner, i. 318

Vegetation, anticipated in its progress by bees, viii. 74

Velino, a river in Italy, has a cataract of an hundred and fifty feet perpendicular in height, i. 222

Velocity, not alone the actuating force of winds, but also the degree of density, i. 355

Velvet, like downy substance upon the skin covering the skull, when the horn of a deer is fallen off, iii. 96

Velvet-duck, a variety of the common-duck, a native of the European dominions, vi. 127

Venary, partridges immoderately addicted to it, to an unnatural degree, v. 209

Venom, given to the weapon of the fireflare by Pliny, Ælian, and Oppian, in a degree to affect the inanimate creation, vi. 255—many reasons to doubt of it, 256

Venus, the Grecian, her nose such as at present would be deemed an actual deformity, ii. 76—a modern lady's face, like that of the Venus of Medicis, would scarce be thought beautiful, except by the lovers of antiquity, ii. 265

Virgæ, or orifices of the snails, are two, one active, the other passive, vii. 31

Verrina, hospitals erected by the Bramins in India for the maintenance of all kinds of vermin, ii. 225—less sound with asses, than with other animals covered with hair, 386

Vertigo in goats produced by immoderate cold, iii. 53

Vesuvius, its eruptions, the most remarkable described by Valesia, i. 91—account of another by Bishop Berkley, 94

Vibrations of a bell cease to be heard when under the receiver of an air-pump, i. 334—the tone of a sonorous body made to depend upon the number of vibrations, not the force, is a mistake of an effect for a cause, ii. 164

Vineta, a port of Pomerania, overflowed and destroyed by the Baltic, i. 278

Violet-crab of the Caribbee islands, most noted for shape, delicacy of flesh, and singularity of manners, vi. 368

Viper, most vivacious of reptiles—experiment on a viper in the receiver of the air-pump by Mr. Boyle, i. 316—kept in boxes for six or eight months, without any food, vii. 179 its progressive motion, 180—the only animal in Great-Britain whose bite is feared, 203—do not devour their young—their food, 205—by the application of salad-oil, the bite of the viper effectually cured—who first discovered this remedy—effects of the viper's bite, 206

Vision, its errors—objects represented upside-down and double, ii. 147—the point without sensation, 150—and want of measure for distance, 151

Viviparous and oviparous animals, the two classes for generation and production—all other modes held imaginary and erroneous, ii. 22—the blenny, a spinous fish, brings forth two or three hundred young at a time, alive and playing around, vi. 175

Ukrains, the cattle there become very fat, and considered the largest of all Europe, iii. 19

Ulloa, his description of part of South America, of Cotopaxi, of Quito, of the Andes, and a volcano, i. 99

Umbilical vessels, those of the placenta to the fœtus, ii. 41

Unan, one of the two kinds of the sloth, an animal about the size of a badger, iv. 343

Under-hung, expression among painters, meaning a prominent under jaw, ii. 91

Understanding, comparative progress of it—greater in infants than in children of three or four years old, ii. 61

Undulations in elastic bodies supposed by the ear one continued sound, though in reality many, ii. 163

Unicorn of the sea, a whale with teeth in the upper jaw, its description, vi. 208—See *Narwhale*.

Uni-valve shells, first division by Aristotle, as to figure, vii. 12

Voice of birds much louder to their bulk than animals of other kinds—set to music by father Kircher, v. 143

Volatile, caustic salt obtained in great quantity from the cantharides flies, viii. 143

Volcano, considered as a cannon of immense size, the mouth near two miles circumference, i. 87—opinions of philosophers and ignorant men about it, 88—the real causes—three very remarkable in Europe, and which, 89—Albournas, most famous in Asia—one in the island of Ternate, 98 in the Molucca islands in Japan, in Java and Sumatra, in the Cape de Verd islands, the peak in Teneriff; also in America, 99—marine ones not very frequent, and why, 130

Vomit, black, a mortal symptom of the distemper called chapatonadas, in America, i. 323

Uranoscopus, a prickly-finned apodal fish, description of it, vi. 306

Urchins, or echini, a multivalve shell-fish, vii. 61—manner of exhibiting this extraordinary animal in every light, 61—its description, 62—some kinds as good eating as the lobster, and its eggs considered as a great delicacy, 63

Urinary passages, effects of the cantharides falling principally upon them, viii. 143

Urine of animals found efficacious in some disorders, iii. 69—of the lion insupportable, 224—of camels, an ingredient in sal ammoniac, iv. 311—of birds differ from that of other animals, v. 17

Ursen, or *Hudson*, of the hedge-hog kind, a native of Hudson's bay, iv. 115—its description—sleeps much, and feeds upon the bark of Juniper—in winter snow serves it as drink, and in summer it laps water like a dog, 115

Ura and bison in fact descendants of one common stock; and naturalists, assigning them different classes, have separated what is really united, iii. 15—this wild bull chiefly met with in Lithuania—description of it, 16—generally taken by pit-falls, 17—the breed chiefly occupies the cold and temperate zones, 20

Vulture-kind, its distinctive marks from other kinds of carnivorous birds—the flesh liked and dressed for eating, according to Bellonius, v. 85—seldom attacks living animals when supplied with dead, 107—description of the golden vulture, 108—vulture and dog, about Grand Cairo, in Egypt, keep together in a sociable friendly manner, and bring up their young in the same nest, iii. 304—of Senegal, said to carry off children, probably no other than the condor, v. 105

Vulture, bird of prey, next in rank to the eagle; less generous and bold, v. 107—countries where found—unknown in England, 109—flocks of them near Grand Cairo not permitted to be destroyed, as they devour all the filth and carrion there—in company with wild dogs, tear and devour together without quarrelling, 110—wonderful method of separating the flesh from the bones, and leaving the skin entire, 111—smell carrion from afar—follow those that hunt for skins alone; and so voraciously fill themselves as merely to waddle, and to want disgorging before they fly away—are little apprehensive of danger, and allow themselves to be approached—an eagle falling in upon their meals, keeps them at a distance till he be satiated—an ox returning home alone, lying down by the way, becomes their prey, and is devoured alive—attempt oxen grazing, destroys lambs, and feed much upon serpents, rabbits, hares, and what game they can overpower—also demolish whole broods of crocodiles, 111—lay two eggs at a time, and produce but once a year—make nests in inaccessible cliffs and remotest places—their flesh lean, stringy, nauseous, tasting and smelling of carrion, 114—the down of their wing makes a pretty kind of fur, commonly sold in Asiatic markets, 109

King of Vultures, description of this bird, v. 115

W.

Waists of European women displeased Linnaeus, who, in a catalogue of monsters, particularly adds their slender waists, ii. 243

Walſchebaas, whales provender, insects floating in clusters on the surface of the sea, and called Medusa, by Linnæus, vi. 199

Walnut-trees, with walnuts on the stem, leaves and branches, in exact preservation, found at twenty-six feet depth round the city of Modena in Italy, i. 282

Wanderow, a baboon, less than the mandril, its description—chiefly seen in the woods of Ceylon and Malabar, iv. 215

Wappe, dog of the mongrel kind, in the third division of Dr. Caius, iii. 286

Warbling of birds, so loud and various in modulation, not easily to be accounted for, v. 14

Warins, the Brazilian guariba, largest of the monkey-kind, found in America, iv. 235—its description, 236

Warts, hog of the isthmus of Darien, described by Wafer, iii. 196

Warwickshire rams not uncommonly worth fifty guineas, iii. 44

Wasps, ruminating insects, or seemingly such, iii. 6—their description and habits—their habitation scarcely completed when the inhabitant dies—have two or three hundred queens in a hive, viii. 96—their nest a most curious object, 97—the social wasps gather no honey themselves, though fond of sweets, 102—fierce battles with the bees, who make up by conduct and numbers the deficiency of prowess, 103—their depredations, 102—where found, other flies desert the place, 103—live but one season, 104—cannot endure winter—before new year they whither and die, having butchered their young—in every nest, one or two females survive—impregnated the preceeding season, she begins in spring to lay eggs—and before June produces ten thousand young, which are nursed and fed by her alone, 105—solitary wasp, its manners, 106—provisions made for the young at leaving the egg—the provisions arranged and laid in, the old one closes the hole and dies—the young leaving the egg are scarcely visible, 108—how the life of the young is spent—wasps of Europe innocent compared to those of tropical climate—description of those of the West Indies, and their habits, 109—pains of their sting insupportable, more terrible than of a scorpion, the part swells, and people are so figured as scarce to be known, 110

Water, its parts infinitely small; driven through the pores of gold, penetrating through all substances, except glass—enter the composition of all bodies, vegetable, animal, and fossil, i. 164—birds, beasts, fishes, insects, trees, and vegetables, with their parts, have growth from it, and by putrefaction become water, 165—gives all other bodies firmness and durability, 163—a phial hermetically sealed, kept fifty years, deposited no sediment, and continued transparent, 168—gathered after a thunder-clap in sultry weather, deposits a real salt, 169—spring-water collected from the air—of river waters, the Indus and the Thames offer the most light and wholesome, 170—lightness, and not transparency, the test of purity, 171—purest water distilled from snow on tops of highest mountains—different kinds adapted to different constitutions, 172—water of the sea heavier and more buoyant than fresh water, 241—very transparent, 171—fresh water at sea putrifies twice, sometimes thrice in a voyage—a month at sea, sends up a noisome and dangerous vapour, which takes fire from a flame, 173—elementary water not compounded, i. 174—is ice kept in fusion, 175—dilates in bulk by cold, 176—confirmed by experiments, 178—very compressible and elastic, 180—made to resemble air, 183—a drop of water converted into steam capable of raising twenty ton weight, i. 184—keeps its surface level and even, 185—a single quart sufficient to burst a hogshead, and how, 187, *et seq.*—of the sea kept sweet by motion, 249—converted into rushing air, and again into its former state, 337—the bramins of India smell the water they drink, to us quite inodorous, ii. 180

Water-spouts, burst from the sea, and join mists immediately above them, i. 377—most surprising phenomena, dreadful to mariners, and astonishing to observers of nature, common in the tropical seas, sometimes in our own—description of those seen by Tournefort in the Mediterranean, 390—solutions offered for this surprising phenomenon, 393

Water-wagtail, slender-billed bird of the sparrow-kind, living upon insects, v. 314

Waves, their luminous appearance in the night, and the cause, i. 247

Wax of two kinds gathered by common bees, viii. 83—the first fifteen days, the bees make more wax than during the rest of the year, 86—that produced by black bees in

tropical climates only used for medicinal purposes, being too soft for candles, as in Europe, 90

Weasel, a small carnivorous animal; marks common to the kind, iii. 346—these differ from the cat-kind in the formation and disposition of claws—differ from the dog-kind in a clothing of fur rather than hair, 346—one of the species is like all the rest, 347—this the smallest of the whole kind, 348—its description—antameable and untractable, 349—hides and sleeps three parts of the day, and sallies forth for prey in the evening, 350—attacks animals much above its own size, 349—catches rats and mice better than cats; also small birds—destroys young-poultry, and sucks the eggs—so nimbly runs up high walls, no place is secure from it, 350—in cultivated lands, it thins the number of hurtful vermin, 359—never cries but when struck—all the kind have glands near the anus, secreting a substance foetid in some, and a perfume in others, 347—this most offensive in summer, and insufferable when irritated, 152—one sort in America is by sailors called the stinkard. See *Stinkard*. Confined to a cage, is ever in uneasy agitation—must have leave to hide itself—eats only by stealth, and will not touch the food until it begins to putrefy, 349—the female makes an easy bed for her young, and generally brings forth from three to five at a time, and with closed eyes, 351—account of a weasel's forming her nest, and bringing forth her young in the putrid carcase of a wolf, 352—the white ermine found in Great Britain is called the white weasel—its fur among us of no value, 358—of the weasel kind, the martin the most pleasing, 368—the boldest and most useful of all is the ichneumon, 376

Weather, the moist alone prevents evaporation, i. 371

Weathercocks often erroneous with Derham in regard to upper regions, i. 353

Weed floating over great tracts of the sea serve as sustenance for many fish bearing similitude with such vegetables, ii. 7

Weever, the trachinus, a prickly-finned jugular fish, its description vi. 300—the sting given by its backfin is poisonous, 32

Weight of the human body often found to differ from itself—instances of it—the difference often amounts to a pound, or sometimes to a pound and a half, not easy to conceive whence this adventitious weight is derived, ii. 110—

the porters of Constantinople carry burdens of nine hundred pounds weight—a man able to raise a weight of two thousand pounds—a horse will not carry upon its back above two or three hundred pounds---whence this seeming superiority comes, 112

Well, burning, at Borsely, now stopped, had a fire-damp in it, which would kindle with the flame of a candle, i. 86
---some continue full, affected neither by rains nor droughts, 282

Welland, river near Spalding, has amazing shoals of sticklebacks caught in it, vi. 328

Wert, Sebald, a traveller, confirms the existence of giants, on a coast of South America, towards the straits of Magellan, ii. 261

Whale, the largest animal known, no precise anatomy of this fish yet given---two centuries ago they were described two hundred and fifty feet long, vi. 182---Biscayneers practised the whale-fishery near Greenland soon after the year 1300, i. 250---seven different kinds, distinguished by external figure or internal conformation, 193---are gregarious animals, make migrations from one ocean to another, 201---and generally resort where they have the least disturbance, 192---great Greenland whale, its description, vi. 191---from sixty to seventy feet long---the head one third of its bulk, 191---its hearing is acute, 193---breathes air at the surface of the water, and cannot remain under it like other fishes, 167---it blows loudly through the spout holes, and most fiercely when wounded---whalebone different from the bones of the body, v. 197---the fins are from five to eight feet long, 191---the throat is narrow, nothing larger than a herring can be swallowed, 198---the tail its only weapon of defence, is twenty-four feet broad, and strikes hard blows, 191---one seen by Ray marbled, with the figures 123 distinctly marked upon it, 193---the blubber and other parts turn out to very good account---the flesh palatable to some nations, 205---the female and male keep much together; their fidelity exceeds that of birds---instance of it, 195---do not cross breeds---she goes with young nine months, is then fatter than at other times---produces two breasts and teats at pleasure---suckles her young a year, and how---is very tender of them---defends them fiercely when pursued---instance of it---dives with them, and comes up soon to give

them breath---during the first year, called short-heads, and then yield fifty barrels of blubber---at two years, they are stunts, and after that skull-fish, 195---the food of this animal, an insect called medusa by Limeus, and walfischaas by the Icelanders---pursues no other fish, and is inoffensive in its element, 198---the whale-louse, of the shell-fish kind, sticks to its body as to the foul bottom of a ship, gets under the fins, and eats through the skin into the fat, 199---the sword-fish affrights the whale, avoids the stroke of its tail, bounds upon its back, and cuts into it with the toothed edges of its bill, 199---the killer, a cetaceous fish of great strength, with powerful teeth, beset the whale as dogs do a bull, tear it down, and then devour only its tongue; 200---old manner of taking whales, 202---improvements hinted, 205

Spermaceti Whale, the cachalot; has teeth in the under jaw---is less than the whale, about sixty feet long, and sixteen high---can remain longer under water; and the head makes one half of the whole---is voracious and destructive even to dolphins and porpoises, vi. 213---seven distinctions in this tribe, 213---contain two precious drugs, the spermaceti and ambergris; the latter mostly in older fishes, 215. See *Cachalot*.

Wheat and currants; swallowed whole, indigestible to man; so may many kinds of food be in the stomachs of animals, v. 74

Wheat-ear, a thick short-billed bird of the sparrow-kind, thought foreign, v. 315---it migrates before winter, 318

Whin-chat, a slender-billed bird of the sparrow-kind, v. 314---bird of passage, 318

Whip-snake, a very venomous serpent of the east, is five feet long, and its bite kills in six hours time, vii. 214

Whirlpool, manner in which it is formed, i. 265---those of the ocean particularly dangerous, 267---the central point always lowest, and why, 205

Whirlwind, the most rapid formed by united contributions of minerals, vegetables, and animals, increasing the current of air, i. 338

Whiskers, a man without them formerly considered as unfit for company in Spain; nature denying, art supplied the deficiency---a Spanish general borrowing money from the Venetians, pawned his whiskers, and took care to release them---part of the religion of the Tartars consist in

the management of their whiskers; and they waged war with the Persians as infidels, whose whiskers had not the orthodox cut, ii. 96—the Kings of Persia wore them matted with gold thread; and the kings of France, of the first races, had them knotted and buttoned with gold, 96

Whiffen, his reasoning concerning the theory of the earth—finds water enough in the tail of a comet for the universal deluge, i. 28

White, the natural colour of man, all other tints proceed from greater or lesser heat of climates, ii. 233—among white races of people, our own country bids fairest for pre-eminence, 235

White-bait, shoals appear near Greenwich in July; and seem the young of some animal not come to perfect form, vi. 337

White-nose, the *monstec*, monkey of the antient continent, a beautiful little animal—its description—a native of the Gold Coast, iv. 234

White-throat, a slender-billed bird of the sparrow-kind, living upon insects, v. 314

Widgeon, a variety of the European duck described, but best known by its whistling sound, vi. 130

Wild man of the woods, the *ouran-outang*, foremost of the ape-kind—this name given to various animals walking upright, but from different countries, and of different proportions and powers—the *troglydys* of Bontius, the *drill* of Purchas, *pygmy* of Tyson, and *pongo* of Battel, have all this general name, iv. 189

Wind, a current of air—artificial, i. 337—causes assigned for the variety, activity, continual change, and uncertain duration of it, 338—in what manner to foretel the certainty of a wind, as the return of an eclipse—to account for variations of wind upon land, not at present expected, 339—recourse to be had to the ocean—and why—in many parts of the world the winds pay stated visits—in some places they blow one way by day, and another by night; in others, for one half year they go in a direction contrary to their former recourse; in some places the winds never change, 340—the wind which never varies is the great universal wind, blowing from the east to the west, in all extensive oceans, where the land does not break the general current, 341—the other winds are deviations of its current—many theories

to explain the motion of the winds—that of Dr. Lyfter—
theory of Cartesius—Dr. Halley's more plausible, 342,
et seq.

Trade-winds, blow from the poles towards the equator,
i. 343—were the surface of the globe sea, the winds would
be constant, and blow in one direction—various circumstan-
ces break its current, and drive it back against its general
course, forcing it upon coasts that face the west, 344—want
of a true system of trade-winds, supplied by an imperfect
history of them—north wind prevails during October, No-
vember, December, and January, in the Atlantic, under
the temperate zone—north wind reigns during the winter in
Nova Zembla, and other arctic countries—south wind pre-
vails during July in the Cape de Verd islands—north-west
wind blows during September at the Cape of Good Hope—
regular winds produced by various causes upon land—anci-
ent Greeks first observed them, 346—in general, wherever
a strong current of water, there is a wind to attend it—re-
gular winds produced by the flux and reflux of the sea—
winds called *monsoons*, 347—some peculiar to certain coasts
—south wind constant upon those of Chili and Peru—other
winds particular to various coasts, 348

Winds at land, puff by intervals, and why—not so at sea,
i. 352—east wind more constant than any other; and gene-
rally most powerful—wind blowing one way, and clouds
moving another, forerunners of thunder—cause of this sur-
prising appearance remains a secret, 353—from sea, gene-
rally moister than those over tracts of land—more boisterous
in spring and autumn than at other seasons, 354—their force
does not depend upon velocity alone, but also upon density
—reflected from sides of mountains and towers, often more
powerful than in direct progression, 355—raise sandy deserts
in one country, to deposit them upon some other—south
winds in summer, so hot in Egypt as almost to stop respira-
tion, and produce epidemic disorders, continuing for any
length of time, 357—deadly along the coasts of the Per-
sian Gulph, and of India, 359—assume a visible form,
358

Wind-pipe, in men has a lump not seen in women, ii. 102
—makes convolutions within a bird, and is called the laby-
rinth, v. 13—this difference obtains in birds seemingly of

the same species, v. 14—strange in the throat of the crane, 37—of the bittern, vi. 2—in the wild swan, 114

Wings of birds, answer four legs of quadrupedes—their description—bustard wing, v. 7—flap of a swan's wing breaks a man's leg; a similar blow from an eagle lays a man dead instantly, 9—of butterflies, distinguish them from flies of other kinds—their number and beautiful colours, viii. 55

Winter beginning round the poles, the misty appearance of heat in southern climates is there produced by cold, i. 378

Wivri, a monkey of the sagoin kind, remarkable for the tufts of hair upon its face, and its annulated tail, iv. 237

Wulga, its length—abounds with water in May and June; at other times very shallow—the English disappointed in a trade into Persia through it, i. 209—receives thirty-three lesser rivers in its course, 217—and has seventy openings into the Caspian sea, 231

Wolf, a fierce, strong, cunning carnivorous quadrupede, externally and internally so nearly resembling the dog, they seem modelled alike, yet have a perfect antipathy to each other, lii. 309—description of the wolf, 306—principal distinction from the dog is the eye, which opens slantingly upwards in the same direction with the nose, 307—also the tail is long, bushy, hanging lank—the wolf lives about twenty years—is not much with those of his kind, yet hunts in packs with them, 311—quarrelling, they devour each other, 110—is watchful, and easily waked—supplied with water, lives four or five days without food—carries off a sheep without touching the ground, and runs with it swifter than the shepherds his pursuers, 315—smells a carcase at a great distance, 316—leaving the wood, goes out against the wind—particularly fond of human flesh—follow armies, and arrive in numbers upon a field of battle—two or three wolves keep a province for a time in continual alarm, 317—distinguished by huntsmen into young, old, and great wolf—manner of hunting them, 318—young dogs shudder at their sight, 309—the wolf killed, no dogs shew an appetite to enjoy their victory, 318—the flesh so very indifferent, no creature eats it but the kind itself—breathe a most fetid vapour from their jaws, 323—often die of hunger, after run-

ning mad by furious agitations, 109—season for coupling lasts but fifteen days—no strong attachment appears between male and female; seek each other only once a year—couple in winter, several males then follow one female, dispute cruelly, growl, and tear each other, and sometimes kill that preferred by the female—she flies from all with the chosen when the rest are asleep, 311—males pass from one female to the other—time of pregnancy about three months and a half—couple like the dog, and the separation hindered by the same cause—bring forth from five to six, or nine at a litter—the cubs brought forth with eyes closed, 312—young wolves play with hares or birds brought by their dams, and end by killing them, 313—able to engender when two years old, 314—wild dogs partake of the disposition of the wolf, 276—the wolf taken young is gentle only while a cub; as it grows older, discovers its natural appetite of rapine and cruelty, 277—experiments prove neither wolf nor fox of the same nature with the dog, but each a distinct species, 298—France, Spain, and Italy much infested with them; England, Ireland, and Scotland, happily free—king Edgar first attempted to rid this kingdom, and in what manner, 319—Edward I. issued a mandate to Peter Corbet for the destruction of them—some quite black, some white all over—found in Asia, Africa, and America, 320—in the East trained up for shew, taught to dance and play tricks; one thus educated sells for four or five hundred crowns—in Lapland, the wolf never attacks a rein-deer when haltered—wolves of North America used in hunting, 321—caught in pit-falls; a wolf, a friar, and a woman taken in one in the same night, 319

Golden wolf, the Latin name for the jackall, iii. 334

Wolf-fish, the anarbias, a soft-finned apodal fish, its description, vi. 307

Womb, history of the child in the womb, ii. 39—of the hare divided in two, as a double organ, one side of which may be filled, while the other remains empty, vi. 6—description of the false womb of the opossum, 243, *et seq.*

Woman, the body arrives at perfection sooner than in men, ii. 79—the persons of women as complete at twenty as those of men at thirty, 80—the bones, cartilages, muscles, and other parts of the body, softer than in men—a woman of sixty has a better chance than a man of that age to

live to eighty—women longer in growing old than men, 199—the shoulders narrower, and the neck proportionably longer than in men, 107—after a catalogue of deformities, Linnæus puts down the slender waists of the women in Europe, by strait lacing, destroying their health, through a mistaken notion of improving their beauty, 243—less apt to become bald than men; Mr. Buffon thinks they never become bald; there are too many instances of the contrary, 86—in the polar regions as deformed as the men, 21—women of India described—marry and consummate at eight, nine, and ten years old, and have children at that age—cease bearing before the age of thirty—those of savage nations in a great measure exempt from painful labours, 224—some continue pregnant a month beyond the usual time—those of Africa deliver themselves, and are well a few hours after, 47—remarkable instance of the power of imagination upon the fœtus, 246—lower eye-lids drawn downwards when with child—the corners of the mouth also—then likewise high shouldered—circumstances under which the midwives call them all mouth and eyes, 104—in barbarous countries, the laborious duties of life thrown upon the women, 71—the chief and only aim of an Asiatic is possession of many women, 72—instance, in our own country, of a fine woman married to an eunuch, 74—a principal employment of those of Thibet, is reddening the teeth with herbs, and making their hair white, 77—first impulse of savage nature confirms women's slavery; the next, of half barbarous nations, appropriates their beauty; and that of the perfectly polite engages their affections, 122

Woods, in Britain, cut down by the Romans, and for what reason, i. 286

Wood-cock, or *cock of the wood*, of the grouse-kind, places which this bird inhabits—how distinguished from other birds of the poultry-kind—the delicacy of its flesh—its food and habitation—amorous desires first felt in spring, v. 200—keeps to the place where he first courts, and continues till the trees have their leaves, and the forest is in bloom—its cry, clapping of wings, and ridiculous postures in this season—during which the females, attending his call, are impregnated; sportsmen use this time to fire at them, and take many while thus tame, though at others it is most timorous and

watchful, 202—the female much less than her mate, and so unlike him in plumage, she might be mistaken for another species—number and size of the eggs—she hatches them without the cock; and when obliged to leave them, in quest of food, so covers them with moss or leaves, it is difficult to find them—she is then extremely tame and quiet—keeps her nest, though attempted to be driven away—the young being hatched, they run with agility after the mother, though scarcely disengaged from the shell, 203—their food ant's eggs, and wild mountain berries—older, they feed upon tops of hether, and cones of pine trees are hardy—the clutching time over, the young males forsake the mother; keep together till spring, when the first genial access sets them at variance for ever—fight each other like game-cocks, and easily fall a prey to the fowler, 204

Woodcock, bird of the crane-kind, its dimensions, vi. 23—food, 25—is a bird of passage—places where it is to be found, 28

Woodchat, a rapacious bird, third kind of the butcher-bird, v. 136

Wood-louse, its description—has three varieties—where found—how bred—are of use in medicine—vii. 286

Wood-pecker, of this bird are many kinds and varieties in each, v. 249—general characteristics, 248—description of the *green wood-pecker*; or *wood-spite*, called the *rain-fowl* in some parts—feeds upon insects, particularly those in hollow or rotting trees—description of its tongue, the instrument for killing and procuring food, 249—want that intestine, which anatomists call the cæcum, 249—stratagem used by them to catch ants, 252—in what manner they make nests, and how delicate in the choice—number of eggs, 253—nests in warmer regions of Guinea and Brasil, 254—*little wood-pecker*, called by the natives of Brasil *guiratemga*, 255

Woodward, his essay towards a Natural History—detail of it, i. 26, *et seq.*

Wool, the Spanish finer than ours; but in weight not comparable to that of Lincoln or Warwickshire—some Spanish wool required to work up with it, iii. 44—of the *pacos*, most valuable, and formed into stuffs, not inferior to silk; this manufacture a considerable branch of commerce in South-America, iv. 317

Worms, within the body of the caterpillar, devour its entrails, without destroying its life, viii. 47---of different kinds infect each species of fish, vi. 343---*sea-worms* make the shells of fishes their food, vii. 16.

Blind-worm of the serpent-kind, its description---lies torpid all winter, vii. 121.

Froth-worm, an insect in that sort of substance on the surface of plants---description of it, vii. 358.

Worm-kind, general description of the *earth-worm*, viii. 166---entirely without brain, but with the heart near the head, 168---in what manner taken, 169---its eggs, 168---nourishment---keeps life in separated parts, 170.

Wrassey, the labrus of the prickly-finned thoracic-kind---description of this fish, vi. 303.

Wren, and *golden crowned wren*, slender billed birds of the sparrow-kind, v. 314---*willow-wren*, a wandering bird of the sparrow-kind, 318---the singing bird admired for the loudness of its note, compared to the smallness of its body, 335.

Wrinkles, whence those of the body and face proceed, ii. 197.

Wry-neck, or *cuckoo's attendant*, a little bird most active in the chase of the young cuckoo, v. 266.

X.

Xiphias, or the *sword-fish*, of the prickly-finned apodal kind, its description, vi. 305.

Y.

Young people sometimes cease growing at fourteen or fifteen, ii. 79.

Z.

Zealand, inundations there, in which many villages were and remain overflowed, i. 278.

Zebra, the most beautiful, but wildest animal---a native of the southern parts of Africa---nothing exceeds the delicate regularity of its colour---description---watchful and swift, ii. 390---its speed a proverb among Spaniards and Portuguese stands better upon its legs than a horse---in what countries found, 396---the Portuguese pretend to have tamed, and sent four from Africa to Lisbon, to draw the king's coach---some sent to Brasil, could not be tamed---Merolla asserts, when tamed, they are still as estimable for swiftness as beauty, 397---their noise resembles the confused barking of a mastiff dog---in two, the author saw the skin below the jaw upon the neck.

hung loose in a kind of dewlap—they are easily fed; some in England eat bread, meat, and tobacco—the emperor of Japan made a present of sixty thousand crowns value, for one received from a governor of Batavia, 398—the Great Mogul gave two thousand ducats for another—African ambassadors to the court of Constantinople, bring some with them, as presents for the Grand Seignior, 399—zebra and wild ass of a very different species, 376

Zebu, the *Barbary cow*, and the *prunting* or *Siberian cow*, are but different races of the *cow*, iii. 23

Zetran, name of the fourth variety of gazelles, by Mr. Buffon, iii. 73

Zembia, Nova, north wind reigns there during winter, i. 346—a description of its inhabitants, ii. 213, *et seq.*

Zeu, the *vorax*, of the prickly-finned thoracic kind, description of that fish, vi. 305

Zibet, one of the two species of the civet, according to Mr. Buffon—distinction between them, iii. 389

Temperate zone, properly speaking the theatre of Natural History, i. 14

Torrid zone, in the centre the heat very tolerable, in other places the cold painful—temperature and advantages of perpetual spring under it, i. 150—lightning there not fatal or dangerous, 379—has the largest quadrupedes—all fond of the water, iii. 28

Zoophytes, name of Vegetable Nature endued with animal life, viii. 161—first class of zoophytes, 166—all the tribe continue to live in separate parts; one animal by cuttings, divided into two distinct existences, sometimes into a thousand, 171—second class, 174

Zorille, a stinkard, of the weasel-kind—resembles the *stink*—is smaller and more beautifully coloured, iii. 181

T H E E N D.



...and the ... of the ...

